THE IRON TRADE REVIEW

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Plant Activities Show Increased Demand

Some Low Prices Still Being Made on Pig Iron, but Tendency is Toward Firmness—Railroad Financing Gives Renewed Hope

Evidence of slow but substantial improvement in the iron and steel markets continues to accumulate. This is shown in the gradual increase of new orders and specifications against contracts, the hardening of prices with a few advances, and in increased activity of mills and furnaces. Blast furnace operations of the United States Steel Corporation have been increased this week to about 60 per cent as compared with about 56 per cent last week. Finishing mill capacity continues to keep a little ahead of the blast furnace production. A decrease of the pig iron stocks of the Corporation was effected last week.

Iron Ore

Negotiations are pending for the sale of a large block of Spanish ore to eastern blast furnaces at 8 cents per unit, delivered in Philadelphia. Sales of 30,000 tons of New York and New Jersey ore have been made at from 7½ to 8 cents per unit, delivered to consumers. There is no interest in Lake Superior iron ore.

Pig Iron

The trend of the pig iron market is in the right direction. It is not probable that foundry iron prices will be much, if any, higher during the next five or six weeks, but there is a belief in the trade that consumption at present is slightly in excess of the current rate of production, and that it will be possible gradually to absorb stocks in furnace yards. Buyers generally are showing a strong disposition to contract for forward delivery, and an inquiry for 7,000 tons of foundry iron for delivery up to March 1, 1912, was sent out, but furnaces will not quote so far in advance, and are very cautious about quoting at all after July 1. Low prices continue to be made in New England. Sales have been made as low as $15.50, delivered, or $13.05, Buffalo, the lowest price since 1904. At Chicago, 25,000 tons of the lower grades of foundry iron were sold to a cast iron pipe company which has several plants.

Steel Bars

A sale of 2,000 tons of open-hearth sheet bars by an independent mill near Pittsburg, at $25 that city, an advance of $1 a ton, has been made. The sheet bar market is much stronger. Prices on sheets may soon be advanced, and a further advance of $1 a ton on wire products seems to be very probable.

Cast Iron Pipe

Some large contracts for cast iron pipe have recently been placed, including 15,000 tons for the Brooklyn Union Gas Co., of which 9,000 tons will be furnished by the Warren Foundry & Machine Co., and 6,000 tons by Pennsylvania and Virginia foundries; 3,900 tons for Minneapolis and 2,000 tons for Worcester, Mass., both awarded to the leading interest. Some very low quotations are, however, still heard, a sale to Sioux City, Ia., of 6 and 8-inch pipe on a basis of $17.70, Birmingham, being made.

Railroad Buying

The action of the directors of the New York Central lines in authorizing the sale of $30,000,000 in short time gold notes for continuing construction work on the Grand Central Terminal, New York City, and in the electric lines of the metropolis; fourth tracks at the Hudson division; new passenger and freight facilities at Utica, Rochester and other extensions; and the sale by the B. & O. railroad of $10,000,000 in refunding notes, the last portion of the $50,000,000 authorized last May, have furnished additional encouragement to believe that railroad activity on a large scale will not long be delayed. Traveling salesmen report that among buyers the most discussed feature of the present situation is the attitude of the government in regard to freight rate advances.

Structural Material

A fair tonnage of structural contracts has been placed during the last week. Contracts awarded in Chicago amounted to about 9,000 tons. The Cruishank warehouse, New York City, 4,000 tons, has been awarded to the Hinkle Iron Works; a loft at Twenty-third street and Seventh avenue, New York, 1,200 tons, went to the Hay Foundry & Iron Works.

Coke and Scrap

There is a marked increase in activity in the old material market. In the Pittsburg district, prices on nearly all grades show a further advance. Coke prices are firmer, and a steel company, with a plant near Pittsburg, has closed for about 10,000 tons, at about $1.50, ovens. A Cleveland furnace has purchased 7,000 tons.

WORLD'S IRON MARKETS

PITTSBURGH

Sheet Bars Sold at Advance—Higher Prices for Old Material.

Office of THE IRON TRADE REVIEW,
510 Park Building, Feb. 14.

Further evidence of the general improvement in the iron and steel trade in this territory is given in the sale of upward of 2,000 tons of open-hearth sheet bars by a near-by mill for early shipment at $25, Pittsburg, an advance of $1 a ton as compared with prices quoted during the past two months, and the withdrawal of the $24, Pittsburg, quotation by some mills. On account of the increased demand for crude steel, steel plant operations have been materially increased during the past week. The Carnegie Steel Co. is operating its 64 open-hearth furnaces at the Homestead works and it is running some of its Ohio steel plants to capacity. The Cambria Steel Co., Johnstown, Pa., is operating all of its 24 open-hearth furnaces and the Republic Iron & Steel Co.'s steel plants are operating to capacity.

The tin plate market is making an excellent showing, the leading interest and independents operating practically to capacity. The wire market continues active and another advance of $1 a ton in the price of all wire products before the end of the month is expected. Reports that the new card will become effective Feb. 20 are not confirmed. Sheet manufacturers met in Pittsburg during the week to discuss trade conditions. Another meeting probably will be held in the near future and the advisability of advancing prices will be discussed. With the exception of steel bars, other finished lines show little change from Feb. 1. Orders for plates and structural steel are not quite as heavy as a month ago.

Further advances in prices of practically all grades of scrap are noted, as a result of the heavy buying on the part of steel companies since the first of the month. On heavy melting steel and bundled sheet scrap, prices are from $1.25 to $1.50 higher than last month. The pig iron market shows more strength than for several months. Sales have been made at advanced prices and some fairly large inquiries have appeared. The basic situation is attracting considerable attention and sales have been made at $14, furnace, an advance of $1 a ton since December. Firm offers for round tonnages at lower prices have been rejected by furnaces. Sales of furnace coke during the week include 10,000 tons to a local steel company at $1.50, ovens, for February shipment, and about 30,000 tons for delivery at a New York state furnace over the next four months. Some inquiry for second half coke is appearing.

Pig Iron.—The pig iron market in this territory is firmer than for several months. Actual sales of basic, foundry and malleable grades have been made at advanced prices and sellers are not quoting very far ahead. On the other hand consumers are showing a disposition to cover for full requirements over the next several months and in some cases inquiries call for delivery over a period of one year. Shipments are gradually increasing, although stocks at furnaces are large. The Cambria Steel Co. has added another stack to the active list, making seven of its eight blast furnaces in service. The Carnegie Steel Co. is operating about 70 per cent of its blast furnace capacity. The Clinton furnace of the Clinton Iron & Steel Co., Southside, Pittsburg, which had been idle since Dec. 24, was started Feb. 13.

The United Steel Co., Canton, O., bought 3,000 tons of basic for delivery in March and April at $14.50, delivered. The iron, it is understood, will come from a nearby furnace having a freight rate of 50 cents. Offers of $13.50, valley, on round tonnages of this grade for first half delivery, and $13.25, cash, for 6,000 tons have been rejected during the past week and the furnaces are not quoting below $14, valley. Sales were made last December as low as $13, valley. Pending inquiries include one for 5,000, one for 3,000, another for 2,000 for first half delivery. In addition, sellers are quietly negotiating with regular customers on several lots on which no inquiries have been sent out.

While $13.75, valley, can still be done on No. 2 foundry iron in some quarters, practically all trading this week has been done at $14, valley, several 500-ton lots having been sold. Sales of this grade were made last month at $13.50, valley. In addition to numerous inquiries for small lots pending in this market, there is an inquiry for between 6,500 and 7,500 tons of No. 2 foundry for delivery over a period of one year, beginning March 1. The quotation of $13.50, valley, on malleable, has disappeared, and the market is quotable at $13.75, valley. Gray forge is stilll quotable at $13.25, valley.

There is less talk of shading on Bessemer and the market appears to be firm at $15, valley, for prompt and first half, a sale of 1,000 to a Pittsburg consumer having been made during the week. We quote the market as follows:

(Prompt Shipment.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	13.75
Basic, Pittsburg	14.65
No. 2 foundry, Pittsburg	14.65
Gray forge, Pittsburg	14.15
Malleable, Pittsburg	14.65

(First Half.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	14.00
Basic, Pittsburg	14.90
No. 2 foundry, Pittsburg	14.90
Gray forge, Pittsburg	14.15
Malleable	14.65

Ferro-Alloys.—Consumers of ferro-manganese and 50 per cent ferro-silicon are covered for first half and sales are confined to carload lots. In a few instances, large consumers are negotiating for second half requirements. Prices show little change, although small lots of 50 per cent ferro-silicon have been sold at slightly higher prices, on account of a shortage of this material for prompt shipment.

We quote ferro-manganese at $37.50 to $38, Baltimore, for prompt and first half of 1911. The freight rate from Baltimore to Pittsburg is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $55 to $55.50, Pittsburg, for prompt and first half; 12 per cent, $25; 11 per cent, $24; 10 per cent, $23, f. o. b. Jisco and Ashland furnaces. The freight rate to Pittsburg is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

Plates.—There has been a fair volume of miscellaneous plate tonnage

booked, although no particularly large awards have been made. New orders for cars have been very light and there is not a great deal of new inquiry in this market. Bids have gone in on the inquiry for 1,000 70-ton steel hopper coal cars for the Wabash-Pittsburg Terminal railroad and the Virginian Railway Co. is in the market for 1,000 steel coal cars. The Wheeling & Lake Erie railroad is understood to be in the market for 500 flat cars. The Pressed Steel Car Co. has started work on 75 tank cars ordered some time ago by the Great Northern railroad. The Carnegie Steel Co. has received several orders for plates involving from 300 to 700 tons each, including one for about 700 tons from the American Ship Building Co., the steel to be used in the construction of the Standard Oil Co.'s barge. Prices are firm at 1.40c, Pittsburg. We quote the market as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.40c. Extras are as follows, per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½ inch to and including 3-16 inch plate on thin edge, 0.10c; under 3-16 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets.—There is a fair volume of business in sheets being placed for nearby delivery and prices are being well held, according to reports read at a meeting of sheet manufacturers held in Pittsburg on Feb. 11, at which practically all mills were represented. It is reported that another meeting will be held before the end of this month, when the question of revising the present price card upward will be considered. Consumers are not buying very far ahead at present, although jobbers are requesting heavier shipments on account of the more general buying, particularly in the west. Some additional sheet mills have been started. We quote prices as follows, with $1 a ton added as the delivered price in the Pittsburg district:

Blue annealed sheets, No. 10 gage, 1.65c; box annealed sheets, No. 28 gage, 2.20c; galvanized sheets, No. 28 gage, 3.20c; painted roofing sheets, 1.55c per square for No. 28 gage, 2½-inch corrugation; galvanized roofing sheets, 2.75c per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—This market continues to make an excellent showing. The leading interest and independents are operating practically to capacity, the Shenango plant, containing 30 mills and the Greer plant, containing 20 mills, which are owned by the leading interest, having been started in full. Some companies are booked to capacity for the next five or six months and are receiving requests from consumers for immediate shipments. The advance of 10 cents per base box has been well received and has resulted in more liberal specifications over the next few months. Reports of another advance to be made shortly in the price of tin plate, although not confirmed, have resutled in some large consumers endeavoring to cover as far ahead as possible at today's prices. Some independent companies in this territory are figuring upon still further enlargements to their plants and it is likely that some of the proposed new mills will be ready for operation by next fall. The base price on tin plate is as follows:

Coke tin plate, 10-pound basis, 14 x 20, $3.70, f. o. b. mill, Pittsburg district.

Rails and Track Material.—As a result of the heavy buying of steel rails since the first of the year, rail mills are operating on a more satisfactory basis than at any time in several months. No important awards have been made in this territory during the past week, although makers report a fair volume of miscellaneous business. The Carnegie Steel Co. has sold 500 tons of standard rails to a traction company for delivery at Akron, O. Lumber interests and other users of light rails are negotiating for their 1911 requirements and some fairly large orders from this source are anticipated. While the railroads are not buying spikes and track bolts for delivery very far ahead, some good sized orders have been placed in this territory since Feb. 1 and the market is somewhat firmer. We quote the market as follows, the base price on open-hearth rails being 1.34c per pound, at the mill:

Fifty-pound and heavier, 1.25c per pound; car-loads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, $26.50 to $27, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard sections, 1.50c, Pittsburg; track bolts, 2.30c, Pittsburg.

Steel.—The sale of 2,000 tons of open-hearth sheet bars by a nearby independent mill for delivery up to April 15 at $25, Pittsburg, an advance of $1 a ton, is causing a great deal of comment and has resulted in some of the other mills practically withdrawing quotations of $24, Pittsburg. During the latter part of November, open-hearth sheet bars were selling around $24 to $24.50, Pittsburg. On Dec. 4, the market dropped to $24 flat. A week later some independent mills were quoting $23, Pittsburg, on open-hearth sheet bars. Following a general meeting of steel manufacturers about the middle of December, all mills began to quote Bessemer and open-hearth billets at $23, and Bessemer and open-hearth sheet bars at $24, f. o. b. makers' mill, Pittsburg or Youngstown. While there is not a great deal of trading in the open market on account of large consumers being covered by contract, specifications are heavier than at any time in months. As a result, mill operations have been materially increased. The Carnegie Steel Co. is operating its 64 open-hearth furnaces at Homestead this week and is running some of its Ohio steel mills to capacity. The Cambria Steel Co., Johnstown, Pa., is also operating all of its 24 open-hearth furnaces. The Republic Iron & Steel Co. is operating its steel works to capacity and the Jones & Laughlin Steel Co. has also put on additional mills. It is likely that some of the new open-hearth furnaces of the Republic Iron & Steel Co., at Youngstown, will be started the latter part of next month. We quote the market as follows:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $23, with the usual extras for size and analysis, and open-hearth rolling billets, $23. Bessemer sheet and tin bars are quoted at $24, and open-hearth sheet bars are quoted at $24, makers' mill, Pittsburg or Youngstown, with full freight to destination added. Forging billets are quoted at $28, Pittsburg.

Hoops and Bands.—In addition to the heavier specifications for hoops and bands, some fairly large orders have been placed by the cooperage trade and inquiry for forward delivery is more general. Prices are unchanged. We quote the market as follows:

Hoops in carload lots, 1.50c; in less than carload lots, 1.65c; bands, 1.40c, base, with net extras, as per standard steel.

Merchant Bars.—Developments in this market during the past week have been of an encouraging nature. Orders for steel bars continue to come from a wide range of customers and buying on the part of transportation companies is more general. Several sales have been made in this territory, involving moderately heavy tonnage and the nature of recent inquiries indicates that users are figuring further ahead upon their requirements. Owing to the improvement in this market, local mills are not quoting 1.40c, Pittsburg, for delivery be-

yond the first half. Notwithstanding the heavier specifications and inquiries for bar iron, prices are not firming up. In the immediate Pittsburg territory, 1.40c, Pittsburg, is the minimum, while 1.35c is being done in nearby districts. Inquiry for shafting noted recently has resulted in several fairly large orders having been placed. We quote the market as follows:

Common iron bars, 1.35c to 1.40c, Pittsburg; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator, 1.40c; channels, angles, zees, tees, under 3-inch, 1.50c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 55 per cent in carloads and 50 per cent in less than carloads, delivered in base territory.

Muck Bar.—A few inquiries for muck bar for forward delivery are appearing, but there has been no important trading. We quote the market nominally at $29, Pittsburg, although orders for forward delivery at $1 a ton higher have been rejected by local mills.

Structural. — No important awards have been made in this market during the week, although the steel companies report a fair demand for structural steel. Fabricators in this territory are bidding on a large amount of structural work in other sections of the country and are operating their shops to greater capacity than last month. In the immediate Pittsburg district, structural awards during the past week have been confined to lots of from 50 to 200 tons for local school buildings, etc., practically all the tonnage going to independent mills. We quote the market as follows:

Beams and channels, 15 inches and under, 1.40c; over 15 inches, 1.50c; zees, 1.40c; tees, 1.45c; angles, from 3 to 6 inches, 1.40c; over 6 inches, 1.50c; universal and sheared plates, 6¼ inches wide and wider, 1.40c.

Merchant Pipe.—With the exception of an order for 15 miles of 16-inch line pipe placed with an independent mill by the Quawpaw Natural Gas Co., of Oklahoma, trading in this market during the past week has been confined to small lots for early shipment. Mills in this section continue to operate on about the same basis as in January, but it is expected that with the awarding of contracts now being negotiated, operations will be increased next month. Bids have closed on the inquiry of the Tri-County Natural Gas Co. for about 80 miles of from 2 to 16-inch steel line pipe, but an award has not yet been made. An order for pipe couplings for the 15 miles of 16-inch pipe noted above and the 30 miles of 10 and 12-inch pipe reported last week has been placed with the Dayton Pipe Coupling Co., with offices in the Oliver building, Pittsburg. Local mills are now working on the orders for 5,000 tons of iron pipe, reported last week, this being one of the largest orders of its kind reported in this market in some months. We quote the following official discounts in carload lots, subject to the usual preferential discount to the larger buyers, merchant pipe, where specified, being offered in from ⅛ to 6 inches:

Iron and Steel Basing Prices.

	Steel.		Iron.	
		Butt weld.		
	Black.	Galv.	Black.	Galv.
⅛, ¼, ⅜ inch.....	72	58	68	54
½ inch	75	63	71	59
¾ to 1½ inch.....	79	69	75	65
2 to 3 inches.....	80	70	76	66
		Lap weld.		
2 inches	76	66	72	62
2½ to 4 inches.....	78	68	74	64
4½ to 6 inches.....	77	67	73	63
7 to 12 inches.....	75	59	71	55
EXTRA STRONG, PLAIN ENDS.				
		Butt weld.		
⅛, ¼, ⅜ inch	69	59	65	55
½ inch	74	68	70	64
¾ to 1½ inch	78	72	74	68
2 to 3 inches	79	73	75	69
EXTRA STRONG, PLAIN ENDS.				
		Lap weld.		
2 inches	75	69	71	65
2½ to 4 inches.....	77	71	73	67
4½ to 6 inches.....	76	70	72	66
7 to 8 inches.....	69	59	65	55
9 to 12 inches.....	64	54	60	50
DOUBLE EXTRA STRONG, PLAIN ENDS.				
		Butt weld.		
½ inch	64	58	60	54
¾ to 1½ inch	67	61	63	57
2 to 3 inches	69	63	65	59
DOUBLE EXTRA STRONG, PLAIN ENDS.				
		Lap weld.		
2 inches	65	59	61	55
2½ to 4 inches	67	61	63	57
4½ to 6 inches.....	66	60	62	56
7 to 8 inches.....	59	49	55	45

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

Boiler Tubes.—As a result of the heavier specifications for merchant and locomotive boiler tubes in this territory since Jan. 1, some additional mills have been started, although the market is not as active as is usually expected at this time of the year. The Tyler Pipe & Tube Co., Washington, Pa., has started its plant practically full time, after having been running part time for some months. We quote the market as follows:

	Steel.	Iron.
1 to 1½ inch	49	43
1¾ to 2¼ inch.....	61	43
2½ inch	63	48
2¾ to 5 inch.....	69	55
6 to 13 inch.....	60	43

2½ inch and smaller, over 18 feet, 10 per cent net extra.

2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destination east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg.

Wire Products.—The advisability of making another advance of $1 a ton in the price of all wire products has been discussed by manufacturers during the past week and definite action along this line is expected in the very near future. From one source it is reported that the new card will become effective Monday of next week, but confirmation is lacking. The last advance of $1 a ton was made Jan. 20. Scattered sales of XXX plain wire and wire nails are noted at $1.55 and $1.75, Pittsburg, respectively. Specifications are coming in at a very satisfactory rate, particularly from large jobbing interests in the west. There has been no change in the price of cut nails, which are still being quoted at $1.65, Pittsburg. The first of the new wire mills of the Cambria Steel Co., Johnstown, Pa., will be started in April, and the entire plant will be in service in May. We quote the market as follows:

Wire nails, jobbers' carload lots, $1.75; retailers' carload lots, $1.80, cut nails, jobbers' carload lots, $1.65 to $1.70; painted barb wire, jobbers' carload lots, $1.75, retailers' carload lots, $1.80, with 30c for galvanizing; plain wire to jobbers in carloads, $1.55, and to dealers, in carloads, $1.60, polished staples, $1.75; galvanized staples, $2.05.

Wire Rods.—All mills are asking $29, Pittsburg, for Bessemer and open-hearth wire rods and several sales at this figure have been reported, although $28.50, Pittsburg, is understood to have been done on particularly desirable business. The new wire rod mill of the Cambria Steel Co., Johnstown, Pa., with a capacity of from 350 to 400 tons a day, will be started tomorrow morning (Wednesday). We quote $29, Pittsburg, for Bessemer and open-hearth rods.

Coke.—A firmer tone is noted in the coke market on account of the increased blast furnace activity during the past few weeks. Low quotations on prompt furnace coke have been withdrawn and the market is firm at $1.45 to $1.50, ovens. A steel company with works near Pittsburg, has closed for upward of 10,000 tons of furnace coke at about $1.50, ovens, while a furnace interest is understood to have purchased about 30,000 tons of coke for its New York state furnace for delivery over the next four months. Several large inquiries for second half coke are appearing, but there has been no important trading for this period. Additional ovens in the Connellsville region have been started and preparations are now being made to greatly increase the active list in that field. Demand for foundry coke is not very heavy, and there has been no change in prices. We quote standard Connellsville furnace coke for prompt shipment at from $1.45 to $1.50, ovens, and for first half at $1.60, ovens. On high grade Connellsville furnace coke, we quote, from $1.95 to $2, ovens, for prompt delivery; for first half, at from $2 to $2.50, ovens. The Connellsville

Courier's figures for the week ending Feb. 4, show 24,741 active ovens with an output of 302,275 tons, as compared with 39,431 active ovens and a production of 291,705 tons the previous week.

Old Material.—As a result of the buying movement in this market last week, prices on practically all grades show a still further advance. While no particularly large transactions are noted this week, there has been moderately heavy buying, with the result that dealers are not quoting the advanced prices for delivery very far ahead. It is understood that practically all of the 18,000 tons of scrap offered by the Pennsylvania Railroad Co. has gone direct to consumers. Heavy melting steel is quoted at from $14.25 to $14.75, an advance of $1.25 a ton, as compared with a month ago. Rerolling rails have been advanced 75 cents and bundled sheet scrap has been advanced another 50 cents, making a total advance of $1.50 since Feb. 1. Old car wheels are quoted at 50 cents a ton higher. An advance of 50 cents a ton is noted in the price of machine shop turnings, cast borings and stove plate, while No. 1 cast scrap is 25 cents a ton higher. We quote, gross tons, delivered in the Pittsburg district, including Monessen, Sharon, Steubenville, Brackenridge and Follansbee, as follows:

Heavy melting scrap	$14.25 to 14.75
Rerolling rails	14.75 to 15.25
Bundled sheet scrap	11.50 to 12.00
Iron axles	24.00 to 24.50
Old iron rails	15.00 to 15.25
No. 1 wrought scrap	13.50 to 14.00
Old car wheels	13.75 to 14.25
Low phosphorus	17.00 to 18.00
Machine shop turnings	10.00 to 10.50
Cast borings	9.25 to 9.75
No. 1 cast scrap	14.00 to 14.50
Malleable	13.00 to 13.50
Stove plate	10.50 to 11.00

CHICAGO

Pig Iron Improves and Conditions in General are Better.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Feb. 14.

Business in pig iron is expanding and sentiment in this direction has improved to a marked extent within the past ten days. This, coupled with continued steady improvement in finished materials, is very gratifying to business interests in the central west. It seems apparent that the up-grade has actually been reached and some of it negotiated. February blast furnace reports will probably show an increased production of pig iron on account of the improved conditions. A notable feature of the improvement in finished lines is the increased business in bars. This is not yet, by any means, as heavy as manufacturers would desire, but there has been a noticeable change for the better. Structural lettings continue heavy and fabricating prices are firmer. Cast iron pipe makers have received large contracts within the past 30 days and prices have stiffened perceptibly. The local scrap market is enjoying a boom, although actual consumers are not being induced to buy very heavily, fearing that the increase in prices may possibly be short lived.

Pig Iron.—There is a noticeable expansion in the pig iron sales, which have been made in this territory during February, compared with the corresponding period during previous months. The market is approaching the activity which it enjoyed during the latter part of October and early November, 1910. A local pipe manufacturer, having plants in Ohio, has purchased upwards of 25,000 tons of low grade pipe-making pig iron for first half and third quarter delivery. Included in this purchase, which was scattered among a large number of selling interests, is a heavy tonnage of Southern No. 4, for which the price is understood to be $10.00, Birmingham, delivered up to June 30. Foundries in Illinois and Wisconsin are commencing to show more interest in the market, although there have been but few notable transactions, with the exception of a sale of 3,000 tons of Southern No. 2 to an Illinois foundry for first half delivery at $11.00, Birmingham. A Milwaukee consumer has purchased 250 tons of 8 per cent silicon at a price said to be close to $19.10, delivered. Furnace interests generally are still reluctant to quote for third and fourth quarter, except at prices which do not interest buyers. Purchasers, however, are constantly sounding the market in an endeavor to pick up bargains for delivery throughout the year. A Chicago foundry is in the market for 400 tons of No. 2 Southern for delivery through the first half. Some buyers claim to have purchased Southern iron for third quarter delivery for the same price as second quarter, but investigation generally shows that there are special circumstances surrounding such deals. In one instance, a foundry made a contract for about 1,000 tons of Southern No. 2 for fourth quarter delivery at $11.00, Birmingham, but agreed to pay for all of the iron by June 30. In other cases, second quarter contracts have been executed to carry a small amount of iron for third quarter also.

We quote the market, f. o. b. Chicago, as follows:

(Prompt shipment and first half.)

Lake Superior charcoal	$17.50
Northern foundry No. 2	15.50
Southern foundry No. 2	15.35
Southern silveries, 5 per cent silicon	16.35
Jackson Co. silveries 8 per cent	19.40
Malleable Bessemer	15.50
Alabama basic	15.35

Billets.—Independent mills in this territory are still quoting open-hearth forging billets, $28 f. o. b. Chicago. A few carload orders have been taken during the past week and aside from this there is very little business under negotiation.

Merchant Bars.—We note an inquiry for 1,000 tons of iron bars from a transportation interest. Iron bar orders during January were somewhat better than in December. Prices at present are firm but there is not sufficient business in the market yet to permit an advance in quotations for immediate shipment. Makers, however, are quoting from $1 to $2 a ton above the current prices for deliveries extending up to July 31. Specifications and new business in steel bars are improving and the store trade is active. There is not much demand at present for reinforcing bars, while it is too early for heavy contracts from agricultural implement manufacturers.

We quote, Chicago delivery, as follows:

Bar iron, 1.30c to 1.35c; hard steel bars, re-rolled, 1.35c to 1.40c; soft steel bars and bands and small shapes, 1.58c to 1.63c, base; hoops, 1.68c to 1.73c; planished or smooth finished tire steel, 1.78c to 1.83c, base; iron finished tire steel, 1.73c, base; smooth finished machinery steel, 1 inch and larger, 1.98c; spring steel, 2.28c; crucible spring steel, 2.78c; tool steel, 7c to 9c, with higher prices for special grades. Quotations on shafting are 57 per cent off the list for carload lots, and 52 per cent off for less than carload lots, carload freight allowed to points in base territory.

On iron and steel from local stock, we quote, as follows:

Bar iron, 1.80c to 1.90c, per pound base; soft steel bars, 1.80c to 1.90c per pound base; soft steel hoops, 2.10c to 2.20c, full extras.

Structural Material.—The fabricating contracts reported in this market last week will require 8,973 tons of plain material. The Corn Products Refining Co. has let a contract for its buildings at Argo, Ill., 3,000 tons, to the Joliet Bridge & Iron Co. The Morava Construction Co. will fabricate the Harned & Von Maur building, Davenport, Ia., 253 tons. The Arkansas river bridge between Fort Smith and Van Buren, Ark., 4,435 tons, has been let to the American Bridge Co. The Des Moines Bridge & Iron Co. has taken a contract from the Chicago, Burlington & Quincy Railway for the West Seventh street highway viaduct, 1,285 tons, at Des Moines, Ia. Estimates are being prepared for the Gunther building, Chicago, 3,000 tons.

We quote mill prices for structural shapes, f. o. b. Chicago, as follows:

Beams and channels, 15 inches and under, 1.58c to 1.63c. For extras, see Pittsburg report.

On structural material from store, we quote, Chicago delivery, as follows:

All angles, 3 inches and larger, including 6 inches, $1.80 to $1.90 per 100 pounds; angles over 6 inches, $1.90 to $2 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.80 per 100 pounds, base; channels, 3 inches and larger, $1.80 per 100 pounds, base.

Rails and Track Supplies. — Local rail mill schedules have improved remarkably since the first of the year and orders from western roads for standard sections are coming in slowly but surely. There is still a very heavy tonnage outstanding which steel makers feel must be placed within the next 60 days. The extensive double-tracking operations which will soon be inaugurated by the Harriman lines will require an extra tonnage of rails which has not been counted on by manufacturers and which would naturally come to western mills.

Track supply orders are increasing materially, although prices have not been advanced. Railroads are specifying liberally and buying heavily for their spring and summer requirements. The leading interest booked about 25,000 tons of track supplies during the past week.

See Pittsburg report for prices on standard sections.

We quote light rails and track supplies, as follows:

Light rails, carloads, 40 to 45-pound, 1.16c to 1.20½c; 30 to 35-pound, 1.19½c to 1.24c; 16, 20 and 25-pound, 1.20½c to 1.25c; 12-pound, 1.25c to 1.29½c.

Light section relayers, 45 pounds and under, subject to inspection, $21 to $23; standard section relaying rails, subject to inspection, $23.50 to $24.

Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; railroad spikes, 1.65c to 1.75c; smaller size spikes, 1.70c, base; track bolts with square nuts, 2.15c to 2.25c, base.

Plates.—Local plate mills are operating at about 70 per cent capacity, an increase of nearly 100 per cent over operations in December. Heavy specifications have been received from car builders and miscellaneous business is good. Buyers are still reluctant to make contracts for future delivery and practically all of the business now booked is for immediate shipment. This condition is quite satisfactory from the manufacturers' standpoint since in actual practice, steel contracts generally prove little more than options to purchase and mills would rather not be tied up with heavy tonnages for future rolling at a specified price, particularly when there is prospect of the market going up.

We quote, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches wide, 1.58c to 1.63c. For extras, see Pittsburg report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, 1.80c to 1.90c; from 72 inches to 96 inches wide, 1.90c to 2c; 3-16 inch up to and including 60 inches wide, 1.90c to 2c; 72 inches, 2.15c to 2.25c; No. 8, up to 60 inches wide, 1.95c to 2.05c. Flange quality and heads, 25c extra.

Sheets.—Sheet business is improving and both specifications against old contracts and new orders are encouraging. All evidence of price cutting seems to have disappeared in the west and all interest in this territory are maintaining quotations.

We quote, store prices, f. o. b. Chicago, as follows:

Blue annealed No. 10, 2.10c to 2.20c; No. 12, 2.15c to 2.25c. Box annealed, No. 28, 2.75c to 2.85c. Galvanized, No. 28, 3.65c to 3.75c.

For mill prices, see Pittsburg report. Freight to Chicago, 18 cents.

Wire Products.—Railroads are closing their yearly contracts for fence wire and liberal orders are being placed by them for nails and other material. Jobbers generally are specifying for their spring stocks of wire and nails, while the demand from agricultural sections continues excellent. Mill operations in this territory are being increased as the occasion demands.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.93; retailers' carload lots, $1.98; retailers' less than carload lots, $2.08; painted barb wire, jobber's carload lots, $1.93; retailers' carload lots, $1.98; retailers', less than carload lots, $2.08; with 30c for galvanizing; plain wire to jobbers, $1.73; plain wire, retailers' carload lots, $1.78; staples, bright, $1.93.

Merchant Pipe and Tubes.—While the present is commonly a dull season for tubular goods, on account of the considerable amount of building going on in Chicago, the trade in merchant pipe is holding up in a very satisfactory manner. There is also some increase in the demand for boiler tubes, both from mills and out of store.

We quote, iron and steel pipe and tubes, out of store, f. o. b. Chicago, as follows:

Iron and Steel Pipe Basing Price.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛-⅜ inch	69.2	54.2	63.2	48.2
½ inch	72.2	59.2	66.2	53.2
2 in. to 3 in.	77.2	66.2	72.2	61.2
4½-6 inches	74.2	63.2	69.2	58.2
7-12 inches	71.2	54.2	67.2	50.2
EXTRA STRONG PLAIN ENDS.				
½ inch	70.2	63.2	64.2	52.2
2-3 inches	75.2	68.2	61.2	55.2
7-8 inches	65.2	....	59.2	47.2
DOUBLE EXTRA STRONG.				
½ inch	58.2	50.2	....	....
2-3 inches	63.2	55.2	....	....
7-8 inches	53.2	41.2	....	....

Tubes.

	Lap weld steel. Per cent.	Charcoal iron. Per cent.	Shelby seamless. Per cent.
1 inch	38	..	57½
1¼ to 2¼ inch	52	38	35
2¾ to 5 inch	62	50	46

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. was awarded a contract by the city of Minneapolis last week, covering 3,900 tons of water pipe from 6 to 60 inches in diameter; 700 tons of this will be for a new filtration plant which is being installed at Minneapolis. A quantity of 6 and 8-inch water pipe has been purchased by Sioux City, Ia., for $23.65, f. o. b. Sioux City, which is equivalent to $17.70, Birmingham. Pipe makers generally report a very satisfactory business during January and prices are much firmer at present. Smaller producers seem less inclined to shade the market.

We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $25; 6 to 12 inches, $24.50, larger sizes, $23.75; gas pipe, $1 a ton higher.

Old Material.—The local scrap market is experiencing considerable activity at present but its duration is problematic. The Santa Fe has again received bids on its large holdings of scrap and the prices were on the average 25 cents above recent sales. Nevertheless none of the material was disposed of, and about 25,000 tons remain in the hands of the railroad. Most of the buying recently has been done on behalf of dealers, consumers of scrap being a little reluctant to enter the market at advanced prices. Dealers, however, have confidence in the future and have bid the market up.

We quote the market for delivery in consumers' yards, Chicago, as follows:

GROSS TONS.

Old car wheels	$12.25 to 12.75
Old iron rails	14.50 to 15.00
Rerolling rails (5 ft. and over)	13.25 to 13.75
Old steel rails (3 ft. and under)	12.50 to 13.00
Frogs, switches and guards	11.75 to 12.25
Heavy melting steel	11.50 to 12.00
Shoveling steel	11.25 to 11.75

NET TONS.

No. 1 R. R. wrought	$11.75 to 12.25
No. 2 R. R. wrought	10.75 to 11.25
Arch bars and transoms	14.50 to 15.00
Knuckles, couplers and springs	11.50 to 11.75
Shafting	15.75 to 16.25
Iron car axles	18.25 to 18.75
Steel car axles	17.50 to 18.00
Locomotive tires	16.00 to 16.50
Dealers' forge	10.50 to 11.00
Pipes and flues	9.00 to 9.50
No. 1 cast, 150 lbs. and less	12.25 to 12.75
No. 1 busheling	9.50 to 10.00
No. 2 busheling	8.50 to 9.00
No. 1 boiler cut	8.75 to 9.25
Boiler punchings	14.25 to 14.75
Cast and mixed borings	6.00 to 6.50
Machine shop turnings	7.00 to 7.50
Railroad malleable	10.75 to 11.25
Agricultural malleable	10.25 to 10.75
Stove plate and light cast scrap	10.25 to 10.75
Angle bars, splices, etc., iron	13.25 to 13.75
Angle bars, steel	11.25 to 11.75

Inquiry for Pig Iron for Forward Delivery Prices Firmer.

Office of THE IRON TRADE REVIEW,
Penton Building, Feb. 14.

Iron Ore.—Furnace men are still content to confine themselves to getting rid of their present surplus of ore, and are willing to wait developments in the general iron and steel business, while the hope is expressed that some plan to insure more permanent stability in the iron ore market will be adopted.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $5; Mesabi Bessemer, $4.75; old range non-Bessemer, $4.20; Mesabi non-Bessemer, $4.

Pig Iron.—Interest in the basic situation continues, and it now seems sure that a large tonnage, near Pittsburg, which was regarded as a possible menace to the situation, will be held until prices advance. The only sale of importance in this territory is 3,000 tons, to the United States Steel Co., of Canton, but there is a very fair inquiry, including one for 5,000 tons.

A number of inquiries indicating willingness of buyers to place orders for large tonnages for forward shipment have appeared. One is for 7,000 tons of foundry iron for delivery during the next 12 months, running up to March 1, 1912. This inquiry is not receiving serious consideration from furnace interests, who say that it would be folly to sell at anything like present prices for such distant deliveries, and it does not seem probable that a consumer would be willing to contract at a price very much higher than present quotations. There is also an inquiry for 5,000 tons of basic, and 1,000 tons of foundry iron for last half delivery.

There are also numerous inquiries for from 100 to 200 or 300 tons, for shipment during the first half of this year. For prompt shipment, $14 at the furnace for No. 2 foundry for delivery in the city has been shaded. We quote delivered in Cleveland for the remainder of this year, as follows:

No. 1 foundry	$14.50 to 14.75
No. 2 foundry	14.00 to 14.25
No. 2 Southern	15.35
Gray forge	13.50 to 14.00
Bessemer	15.90
Lake Superior charcoal	17.50
Jackson Co. 8 per cent silvery	19.00

Coke.—There has been some buying of furnace coke for prompt delivery, and the market on both furnace and foundry is quiet, with prices somewhat firmer.

Connellsville furnace coke, $1.45 to $1.50 for prompt delivery, and $1.60 for first half. Connellsville foundry coke, $1.95 to $2 for prompt, and $2 to $2.50 for first half.

Finished Material.—Although the tonnage placed during the past week has not been as heavy as in the preceding week, owing to the large contracts for vessel material then placed, there has been a good run of new orders and specifications have been satisfactory. Railroads have not been heavy buyers, but we note a sale of 2,500 kegs of spikes. Cleveland architects are inquiring for prices on 150 tons of concrete reinforcing bars for the Hower building, Akron. The improvement in demand for bar iron has been sustained, but owing to the low prices prevailing in Chicago and other districts, the field in which Cleveland mills can sell is limited.

Old Material.—Mills in this city and the general district are demanding immediate shipment of stock contracted for and brisk inquiry is daily received from various points in the district. The outlook continues favorable and some marking up of prices has taken place. It would appear that the demand, while not excessive but in comparison with the past 12 months very encouraging, extends not only to heavy steel and turnings, but also to all the various lines. We quote, gross tons, f. o. b. Cleveland, as follows:

Old iron rails	$16.50 to 17.00
Old steel rails (under 6 ft.)	13.75 to 14.25
Old car wheels	13.50 to 14.00
Old steel boiler plate	11.50 to 12.00
Malleable iron (railroad)	13.25 to 13.75
Steel axles	19.00 to 19.50
Malleable iron (agricultural)	12.00 to 12.50
Heavy steel	13.25 to 13.50
Country mixed steel	11.50 to 12.00

We quote, net tons, as follows:

No. 1 R. R. wrought	$13.50 to 14.00
No. 1 busheling	11.50 to 12.00
No. 1 machine cast	12.50 to 13.00
Axle turnings	9.00 to 10.00
Machine shop turnings	7.50 to 8.00
Grate bars	10.50 to 11.00
Pipes and flues	9.00 to 9.50
Tank iron	8.50 to 9.00
Sheet iron	4.00 to 4.50
Wrought drillings	7.50 o 8.00
Cast borings	7.00 to 7.25
Stove plate	11.00 to 11.50

Buyers Ready to Contract For Last Half—Some Good Inquiry.

Office of THE IRON TRADE REVIEW,
808 Provident Bank Bldg., Feb. 14.

Pig Iron.—The general tone of the market appears to be a shade stronger, and quite a little iron has been sold for prompt delivery during the week. This, however, has been for the most part in small lots, as a large percentage of the heavier melters have enough on hand for present needs. A number of both large and small consumers are showing increased interest in covering for the last six months of the year, and are willing to buy at present prices for this delivery, but are meeting with little or no co-operation on the part of the furnaces, as they are unwilling to commit themselves to present schedule for the year's end delivery. Local foundry inquiry shows little improvement, and as a rule the tonnage melted is below normal capacity. Makers of light gray castings, however, report an increased demand for their product and foundries of this class are fairly busy. One of the large pipe companies is said to be in the market for some round lots of gray forge, if prices can be satisfactorily agreed upon. Southern No. 2 is still quotable at $11, Birmingham, for any delivery up to July 1, and is said to be holding fairly strong at this quotation. Rumors are current that this has been shaded slightly on prompt desirable business, but this has not been substantiated. Northern prices are unchanged and $14, Ironton, is the ruling quotation. Some good buying is reported from Chicago and St. Louis territory, where one or two of the larger buyers came into the market.

The inquiry from one of the local interests for 1,500 to 2,000 tons that has been pending for the past two weeks is still held in abeyance. There is an inquiry from a central Ohio manufacturer for 100 tons of 3 to 4 per cent silicon and 100 tons of southern analysis grades for prompt shipment. A Michigan melter wants 100 tons southern foundry for second quarter delivery. The largest inquiry comes from an Illinois concern and calls for 1,550 tons of northern analysis, 900 tons southern second and third quarter, and 350 tons July to September and 200 tons June to September, a total of 3,000 tons. We quote prices based on freight rate of $3.25 from Birmingham, and $1.20 from Ironton at Cincinnati, as follows:

Southern foundry No. 2	14.25	14.75
Southern foundry No. 3	13.75	14.25
Southern foundry No. 4	13.25	13.50
Southern gray forge	13.00	13.25
Mottled	12.75	13.00
Southern No. 1 soft	14.75	15.25
Southern No. 2 soft	14.25	14.75
Standard Southern car wheel	25.25	25.75
Northern No. 2 foundry	15.20	15.45
Northern No. 3 foundry	14.70	14.95
Northern No. 4 foundry	14.20	14.45
Jackson county 8 per cent silicoon	18.20 to 18.70	

Coke.—There is an inquiry for approximately 7,000 tons and another for about 3,000 tons of furnace coke, delivery covering the next two or three months. In addition to this there has been a fair sprinkling of furnace brands moved, with foundry brands exceedingly quiet and inactive.

Prices are about the same as last week, and from the leading coke producing districts are as follows:

	Prompt Shipment.	Contract to July 1.
Connellsville district:		
Foundry coke	$2.00 to 2.25	$2.25 to 2.50
Furnace coke	1.60 to 1.70	1.65 to 1.75
Wise county district:		
Foundry coke	2.00 to 2.10	2.00 to 2.10
Furnace coke	1.75	*Sliding [scale basis.
Pocahontas district:		
Foundry coke	2.00 to 2.10	2.10 to 2.25
New river:		
Foundry coke	2.50 to 3.25	2.60 to 3.25
Furnace coke	2.00 to 2.15	2.10 to 2.20

*Sliding scale basis means $1.60 for coke based on $9, Birmingham, for pig iron, with an advance of 16 2-3 per cent of the amount over $9 at which pig iron is quoted. This is the usual basis. Other forms of sliding contracts are also made.

Finished Material.—There is an undercurrent of good feeling evident, and a fair amount of trade has resulted during the week. Local structural specifying has been light and little is pending except perhaps the tonnage that will be required for the new union depot building, plans for which are now underway. Prices are unchanged and are strong at 1.40c on plates, shapes and bars, Pittsburg base.

Old Material.—Transactions during the week have been without feature and the market is dull and lifeless. Offerings during the week have been comparatively light, and nothing of importance is reported pending. Dealers are realizing on their stocks, but there is an utter absence of life to the trade. Prices according to dealers are about represented by the following schedule:

GROSS TONS.

Old iron rails, gross	$14.50 to 15.00
Old steel rerolling, gross	13.00 to 13.50
Old iron axles, gross	17.75 to 18.25
Steel melting scrap, gross	11.00 to 11.75
Car wheels, gross	11.00 to 11.50

NET TONS.

Old No. 1 R. R. wrought	$11.00 to 12.00
No. 1 machinery	11.00 to 13.00
No. 1 busheling	10.00 to 10.50
Stove plate	8.00 to 8.50
Heavy turnings	6.50 to 7.00
Cast borings	4.50 to 5.00
Grate bars	8.00 to 9.00
Sheet scrap, busheled	8.50 to 9.00
No. 1 cast scrap	10.50 to 12.00

NEW YORK

Negotiations for Spanish Ore—Still Selling Pig at Low Prices.

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., Feb. 14.

Iron Ore.—Negotiations are being carried on with eastern blast furnace interests for the purchase of a large block of Spanish ore for this year's shipment. The most commonly used grades of this ore have been quoted on the basis of 8 cents per unit of iron f. o. b. cars at Philadelphia, which is the same price at which the last sales of this ore were made the past year. In certain cases, it is reported that lower prices have been made on some grades for shipment up to July 1. Contracts will probably soon be closed for this ore, which is largely used in the east. Sales of about 30,000 tons of New Jersey and New York state ores have been made to eastern furnaces at 7½ to 8 cents per unit, delivered at consumers' plants.

Pig Iron.—Renewed interest by consumers is being displayed in different quarters, but there are opposing positions among makers with respect to prices. The general disposition of the furnaces has been to meet the increasing inquiry with a stronger front, but in some districts, notably New England, sales at sharp concessions are still being made. A round tonnage of iron estimated at 15,000 tons or more is understood to have been closed for by a number of leading New England consumers for delivery principally over the first half, at very attractive prices, which have ranged from $15.50 to $15.80, delivered, for No. 2X foundry. At $15.50, delivered, it is stated, that foundry iron in New England has touched the lowest point since 1904. The business in that territory has been entered by Buffalo, Eastern Pennsylvania and New York State furnaces. Considerable of it has been done on the basis of $13.25, Buffalo, or $15.70, delivered, and in some cases even lower is understood to have been done. For $15.50, delivered, the Buffalo equivalent is $13.05. Such selling is limited to few hands and some furnaces in Buffalo territory are inclined to ask advances on forward shipment. Much of the selling now being done is of the quiet order, since a number of the larger buyers have been sounding the market without open inquiry. A fair tonnage of business has been secured in this way, but other pending negotiations have been prolonged by greater reluctance of some of the furnaces to accept orders upon the old basis. A New Jersey manufacturer of special equipment came out today for 1,000 tons of foundry for the next six months' shipment. Another in the same locality is out for 500 tons. The government has closed for 500 tons of special analysis low phosphorus iron for the Washington navy yard, which will be furnished by foreign makers. Standard eastern Pennsylvania foundry irons, as a rule, are holding firmly around $15.00, furnace, for No. 2X to regular delivery points for such furnaces. In Virginia iron sales were made in eastern territory this week at $13.00, furnace, for 2X, which a few days ago was not attractive to these consumers. The leading Virginia producer is stronger in its price views and is now asking $13.50, furnace, for deliveries beyond April. In southern iron, one maker which has been holding for $11 and has booked considerable business, today withdrew from the market. For prompt and first quarter shipment, we quote as follows:

Northern foundry No. 1	$15.75 to 16.00
No. 2X foundry	15.25 to 15.75
No. 2 plain	14.75 to 15.25
No. 2 Virginia	15.30 to 15.80
No. 2 Southern foundry	15.25 to 15.75
Malleable	15.75 to 16.25
Gray forge	14.25 to 14.50

Ferro-Alloys.—One lot of 1,000 tons of ferro-manganese for a Chicago interest is pending, but as a rule little new business is moving. Consumers still report their ability to buy at low prices. Some of these unconfirmed reports are as low as $37, seaboard, which would probably represent material under pressure to be sold, since regular sellers will not do any such figures. There have been no further developments in the 50 per cent ferro-silicon market since the recent purchase of the leading steel interest. We quote 80 per cent ferro-manganese at from $37.50 to $38, seaboard, covering prompt and forward deliveries, and 50 per cent ferro-silicon at from $55 to $55.50, Pittsburg.

Cast Iron Pipe.—The leading transaction in cast iron pipe of the week has been the purchase of about 15,000 tons by the Brooklyn Union Gas Co. About 9,000 tons of 30 to 42-inch sizes went to the Warren Foundry & Machine Co., while the remaining 6,000 tons of 4 to 24-inch sizes was divided between middlemen and will be furnished by eastern Pennsylvania and Virginia foundries. The price paid was about $21.90, delivered. The leading interest has taken 2,000 tons of 4 to 36-inch pipe for Worcester, Mass., and 500 tons for Danvers, Mass., and 500 tons for Fall River, Mass., has gone to R. D. Wood & Co. Albany and Pittsfield, Mass., are taking bids this week on 500 tons each. There is a larger number of small sized lettings coming out and the market shows some improvement. We quote 6-inch pipe at from $21.50 to $22, f. o. b. New York in carload lots.

Rails and Track Material.—Very few first time rail orders for the requirements of eastern roads are yet to be placed. The New York, Westchester and Boston is still in the market for 5,500 tons and the Bangor & Aroostook tonnage for extensions has not yet developed to a contract but, as reported, it will go to the Pennsylvania

Steel Co. and its subsidiaries. New England traction lines placed orders this week for about 4,100 tons of standard sections. There have been some large purchases of splice bars made by eastern roads apart from the requirements connected with recent rail orders.

Finished Material.—New orders are still coming in at a better volume and there has been no falling-off from the improved rate recently set. Reports of large orders placed are less numerous and this has given rise to some belief that the reaction from the better conditions was setting in but there has been no real evidence of this effect and steel makers continue encouraged over the outlook. The improvement, however, as is most desired, will probably be very gradual. Not a large tonnage of structural material is being placed, but there is a large amount of unplaced work now pending, especially in New York territory, or in the early stages of preparation. The railroads are furnishing very little part of this prospective business, and hold out the inference that their present lack of interest will continue until after the settlement of the freight rate question. Fabricating prices in eastern territory are still exceedingly low, owing to the sharp competition for business.

The Eastern Steel Co. and the Cambria Steel Co. will jointly furnish the 3,500 tons of steel for the catenary bridges for the New York, New Haven & Hartford railroad, the general contract for which is held by the S. W. Bowles Co. The portion awarded the Cambria Steel Co. will be fabricated by the Riverside Bridge Works. The Cruishank warehouse, New York City, 4,000 tons, has been awarded to the Hinkle Iron Works, and 1,200 tons for a loft building at Twenty-third street and Seventh avenue, has gone to the Hay Foundry & Iron Works. The American Bridge Co. has taken 600 tons for mill building for the Union Paper Bag Co. at Sandy Hill, N. Y., and 180 tons in small bridges for the Boston & Maine railroad has been placed with the Phoenix Iron Works. Plans for the McAlpin hotel, this city, have been revised and now call for about 10,000 tons, all of which will be standard sections. This contract was previously reported as having gone to the Bethlehem Steel Co. A telephone building at New Haven, Conn., requiring about 600 tons, is up. Bids have gone in on about 400 tons for car shops for the New York, Ontario & Western, at Middletown, N. Y. Some action is expected this week on the Delaware & Hudson shops at Watervliet, N. Y., 4,000 tons, and upon the Fischell building, New York, about 1,200 tons. There have been no further developments on the Woolworth skyscraper, New York City, or upon the United States Appraisers' Stores at Boston, 2,000 tons. The American Car & Foundry Co. will build at its Berwick, Pa., plant the 1,200 cars recently obtained from the Pittsburg, Shawmut & Northern.

We quote, New York delivery, as follows: Angles, 3 to 6 inches x ¼ inch and heavier, 1.56c to 1.61c; beams, 3 to 15 inches, 1.56c to 1.61c; tees, 3 x ¼ inch and heavier, 1.56c to 1.61c; plates, carload, tank, 1.56c to 1.61c; boiler steel, 1.66c to 1.71c; marine boiler, 1.96c to 2.01c; bar iron, 1.34c to 1.37c; soft steel bars, 1.56c to 1.61c.

Old Material.—A stronger tone is manifested in the old material market and holders of scrap are less inclined to dispose of their stocks on current offers. The more encouraging reports from the finished steel market have rendered them more bullish and higher prices are asked in many cases, especially on heavy steel, for which Eastern Pennsylvania mills are bidding more actively. There is not a large amount of scrap to be offered by the yards in metropolitan territory. We quote, gross tons, prices New York dealers will pay at tidewater, with the exception of cast scrap, which has a local demand, as follows:

Old car wheels	$12.00 to 12.50
Old iron axles	22.50 to 23.00
Old steel shafting	16.00 to 16.50
Heavy melting steel	11.00 to 11.50
No. 1 R. R. wrought	12.50 to 13.00
Iron track scrap	11.50 to 12.00
Wrought pipe	10.00 to 10.50
Cast borings	6.00 to 6.50
Wrought turnings	6.00 to 6.50
Heavy cast scrap	12.00 to 12.50
Railroad, malleable	12.00 to 12.50
Stove plate	9.00 to 9.50
Grate bars	9.00 to 9.50

PHILADELPHIA

Furnace Orders Increase—Scrap Market Buoyant.

Feb. 13.

Pig Iron.—Indications pointing towards greater soundness and to the increased interest among consumers continue to appear. For the first time since February, 1910, the unfilled orders of the furnaces comprising the Eastern Pig Iron Association showed an increase over the preceding month when reported for January at the meeting of the association held in this city the past week. Stocks remained practically unchanged. If the market's present activity continues, it is expected that the February report will make an even better showing. Buyers are displaying more voluntary interest in their forward requirements, but are finding the furnaces less inclined to shade prices, even by the slight margins which have characterized recent negotiations. With the exception of some low prices made in New England by several eastern Pennsylvania furnaces to meet New York state competition, the eastern irons are showing no sharp irregularities. The New England competition, however, has been severe and as low as $13.50, furnace, has been done on some grades of eastern Pennsylvania foundry iron to enable the makers to participate in this business. The commonly quoted price on the leading Lehigh and Schuylkill valley grades, however, is $15, furnace, or $15.50, Philadelphia, for No. 2X. One maker this week advanced its asking price to $16, furnace. The eastern basic market continues to harden under the prevailing conditions of more limited production, and consumers are still covering quite liberally. A total of fully 60,000 tons has been closed in the present movement. Sales of the week under review have included one block of 10,000 tons to a steel company that has been quite active of late in this market and another of 5,000 to 8,000 tons to a second consumer. Reports of other sales are current but unconfirmed. These several blocks of iron are all for delivery by May, and were closed at $14.50, delivered. The sellers of these lots will accept no more tonnage at this price, and are now asking $15, delivered, at which most makers are now holding. More tonnage is under negotiation and on some of this buyers are reported to have offered better than $14.50, delivered. Pipe makers have closed this week for about 10,000 tons additional of lower grade. A New Jersey plant took 5,000 tons and about 5,000 tons in several lots was also taken for the next several months' shipment by two other works. Pipe iron is selling at about $14.25, delivered. Virginia No. 2X is quoted at from $12.75 to $13, furnace, with reports that lower prices may still be done. We quote for prompt and first half shipment, as follows:

No. 1X foundry	$16.00 to 16.25
No. 2X foundry	15.50 to 15.75
No. 2 plain	15.00 to 15.50
Standard gray forge	14.25 to 14.50
Basic	14.50 to 15.00
No. 2X Virginia	15.65 to 15.80
No. 2 Southern	15.00 to 15.50
Standard low phosphorus	21.00 to 21.50

Finished Material. — Eastern plate and shape mills are getting a better tonnage and with some of the former, the aggregate of specifications received the past week has exceeded shipments for the first time in a number of months. As a result, plate mill operations are increasing and are better than 50 per cent of capacity. The new business is coming from well distributed sources, and large orders are the exception. Shipyard repair work is

calling for a good supply of material. Steel bars are not especially active, and it is believed that some consumers are using iron bars for their purposes instead of steel, because of the very low prices of the former. The open quotation on bar iron is about 1.35c, Philadelphia, but 1.30c has been done. Steel bars are 1.55c, Philadelphia.

A fair aggregate of steel is involved in pending building contracts, but awards are slow. The bids on the building for the department of printing and engraving, at Washington, 4,000 tons, exceed the appropriations and the matter is held up indefinitely. The Chesapeake & Ohio car underframe tonnage is still held up. The Woodward office building, Washington, now up, will require about 500 tons. The steel for the Reading railroad coal pockets, about 300 tons, has not been awarded. The Ritz-Carlton hotel project, in this city, is assuming shape, but the present outlook is that it will not require a large tonnage. Finished steel prices are generally firm. Semi-finished steel is strong, rolling billets being $25.40, Philadelphia, and wire rods $29, Pittsburg.

We quote, delivered in Philadelphia and vicinity, as follows:

Structural shapes, 1.55c to 1.60c; steel plates, 1.55c; steel bars, 1.55c to 1.60c; refined bar iron, 1.30c to 1.35c; 4 x 4-inch open-hearth rolling billets, $25.40; forging billets, $30.40.

Old Material.—The scrap market in this territory has developed a very sensitive condition as a result of buyers more freely carrying the market to sellers. The eastern steel mills are more interested in tonnage lots of heavy steel and where $13, delivered, went begging a few weeks ago $13.50, delivered, was offered by buyers this week. A round tonnage was offered by one mill at this price, but dealers are more independent and some of them are asking $14, delivered. Two of the eastern mills have been taking in steel steadily in small lots and are well covered, but the others will need considerable material soon. Eastern consumers have been buying old iron rails, which are being imported from Peru, paying about $17.25, delivered. It is reported that about 6,000 tons of this material will soon be brought in. Offers of $9.25, delivered, for turnings have been made by buyers. The Pennsylvania railroad obtained advanced prices on its large list closed this week. The steel went at $13.50, the No. 1 wrought at $15.75 and the car wheels at $13.50, all delivered prices. The Reading is closing on its list. We quote gross tons, delivered in eastern Pennsylvania:

Old iron rails	$17.00 to 17.50
Old steel rails (re-rolling)	15.00 to 15.50
Heavy melting steel	13.50 to 14.00
Old car wheels	13.50 to 14.00
Old iron car axles	25.00 to 26.00
Old steel car axles	20.00 to 21.00
No. 1 railroad wrought	15.75 to 16.50
Wrought pipe	13.00 to 13.50
Cast borings	8.25 to 8.75
Wrought turnings	9.00 to 9.50
Heavy cast scrap	14.00 to 14.50
Railroad malleable	12.00 to 12.50
Stove plate	10.50 to 11.00

ST. LOUIS

Sales and Inquiries Lend Strength to Pig Iron Market.

Feb. 13.

Pig Iron.—With inquiries for pig iron totalling 6,000 tons, and sales aggregating about 5,000 tons during the last four days, local sales agents believe conditions in the St. Louis territory are considerably stronger than for quite a while. The inquiries that go to make up the 6,000 tonnage are nearly all for southern iron, and one of them is for 3,000 tons for a concern in Quincy, Ill. Deliveries are asked for first and second quarters and even as far ahead as Oct. 1. Southern No. 2 iron is still quoted at $11 to $11.50, Birmingham, but it is generally understood that one furnace outside of the Birmingham district is quoting a price of $10.75. One sale of 500 tons of southern iron was made today, but the price was not made public. Northern iron continues to be quoted at $14 to $14.50, Ironton, but inquiries are light, and sales have been few and in small lots within the last few days. We quote southern iron, delivered, to which the Birmingham freight of $3.75 has been added, as follows:

Southern No. 1	$15.25 to 15.75
Southern No. 2	14.75 to 15.25
Southern No. 3	14.25 to 14.75
Southern No. 4	13.75 to 14.25

Coke.—Inquiries for coke have improved considerably within the last week, and the market shows a decidedly better tone. Some local sales agents say the better grades of foundry coke have been advanced 10 cents a ton, but the prices prevailing in the St. Louis territory are as follows:

We quote 72-hour Connellsville foundry grades, $2.35 to $2.50 for whole of 1911; 72-hour foundry, $2 to $2.25, on tracks and for immediate delivery; 48-hour Connellsville furnace, $1.60 to $1.85; best 72-hour Virginia foundry, $2 to $2.35; 48-hour Virginia furnace, $1.60 to $1.85. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Old Material.—A much stronger and active feeling is noted, especially among the dealers, some of whom are even inclined to be bullish, but transactions have not been heavy within the last week. The following quotations about reflect the market in the St. Louis territory.

Old car wheels	$13.50 to 14.00
Old iron rails	14.50 to 15.00
Rerolling rails (4 ft. and over)	13.00 to 13.50
Old steel rails (2 ft. and under)	12.00 to 12.50
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	24.50 to 25.00
Frogs, switches and guards	12.00 to 12.50
Heavy melting steel	12.00 to 12.50
Shoveling steel	12.00 to 12.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$11.50 to 12.00
No. 2 R. R. wrought	10.50 to 11.00
Arch bars and transoms	14.00 to 14.50
Knuckles, couplers and springs	12.00 to 12.50
Shafting	15.00 to 15.50
Iron car axles	18.50 to 19.50
Steel car axles	18.50 to 19.50
Locomotive tires	14.50 to 15.00
No. 1 country wrought	9.50 to 10.00
Pipes and flues	9.00 to 9.50
No. 1 cast, 510 lbs. and less	12.00 to 12.50
No. 1 busheling	10.25 to 10.75
No. 2 busheling	7.00 to 7.50
No. 1 boiler cut	9.00 to 9.50
Boiler punchings	10.25 to 10.75
Cast and mixed borings	5.00 to 5.50
Machine shop turnings	7.00 to 7.50
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.00 to 9.50
Stove plate and light cast scrap	9.50 to 10.00
Angle splice bars, iron	13.25 to 13.75
Angle splice bars, steel	12.00 to 12.50

BUFFALO

Fair Number of Inquiries—Shipments Increase.

Feb. 14.

Pig Iron.—Although there has been no advance in price, the market seems a little steadier this week, and there is talk of the extremely low prices that have prevailed in this district for several weeks being raised. A representative of one of the interests that have been quoting very low says that his concern is talking of making a substantial advance, and that in his opinion the present low prices will not last more than a very short time. During the week, a heavy volume of business has been booked, ranging from car load lots up to 2,000 tons in the foundry grades. Inquiries have been coming in fairly well. There has been a decided improvement in the shipments, which are now going forward from the furnaces in better volume.

No. 1X	$14.00 to 14.50
No. 2X	13.50 to 14.25
No. 2 plain	13.50 to 14.00
No. 3	13.50 to 14.00
Gray forge	13.50 to 14.00
Malleable	14.00
Basic	14.50
Charcoal	17.25

We quote f. o. b. furnaces, as follows:

Finished Products.—Little change is noted this week inasfar as finished products are concerned. The demand for structural material continues light with a bright outlook for the spring business. There have been no important lettings during the week, and

specifications are light. General lines are fairly active.

Old Material.—The old material market continues dull, but there is some improvement over the conditions of a few weeks ago. Sales have been few and mostly small lots. We quote gross tons f. o. b. Buffalo, as follows:

Heavy melting steel	$12.75 to 13.00
No. 1 railroad wrought scrap	14.75 to 15.25
No. 1 raillroad and machine cast scrap	14.00 to 14.50
Old steel axles	18.50 to 19.00
Iron axles	23.00 to 24.00
Car wheels	13.75 to 14.25
Railroad malleable scrap	13.75 to 14.00
Machine shop turnings	7.00 to 7.25
Cast iron borings	6.50 to 6.75
Low phosphorus steel scrap	17.00 to 17.50
Old iron rails	16.75 to 17.25
Tank iron	10.75 to 11.25
Sheet iron	6.50 to 7.00
Pipes and flues	10.75 to 11.25
Stove plate	12.00 to 12.50
Grate bars	11.50 to 12.00
Boiler plate	11.50 to 12.00

San Francisco

Buying Pig Iron Slowly—Demand for Bars is Sustained.

Feb. 8.

There has been little to remark in the way of features in the local market during the past two weeks, and with the exception of the abolishing of the differential of 20c between iron and steel there have been few changes. All machinery lines are being prepared for the spring business which is expected in implements and power plant development, the extension of gas and water mains and structural material. A little life is noted in rails for new work, a number of interior electric companies, recently formed, being nearly ready to proceed with construction work and a number of extensions being planned by some of the existing steam and electric roads.

Pig Iron.—The market is very dull and melters are buying very slowly, the recent arrival of 1,000 tons of English pig being entirely adequate for current needs. There is very little southern pig on the market and scarcely any call for it. We quote:

English Pig	$22.00
Continental	22.00
Southern	21.50

Bars.—The continued activity in reinforced structures both in the building line and in dams for power sites keeps a well sustained demand for bars and the jobbers are commencing to dispose of some large lots in this line. Iron bars are quoted from $1.90 to $2.05 in small lots with a slight disposition to shade on large orders. Foreign material to arrive is quoted as low as $1.70.

Pipe.—There is a prospect for a good spring business on cast iron pipe, a number of water works' extensions being in prospect, together with some oil pipe line construction. Several large orders for line pipe are in prospect in the southern part of the state, among them the Southern California Gas Co., which has asked for bids on a large amount of pipe of graduated sizes. The latest contract let was for 8-inch and 14-inch pipe at $30.25 per ton.

Old Material.—With the exception of wrought scrap which is in fair demand and very moderate supply, the old material market is rather sluggish. Melters are calling for very little metal at present. We quote:

Cast iron, net	$18.00 to 18.50
Melting scrap, gross	12.50
Wrought, net	12.00 to 13.00
Rerolling rails, net	15.00

Heavy Buying Within Early Date is Expected.

Feb. 9.

Pig Iron.—Foundries and shops are running along at a moderate rate and little buying except for the general trade was noted this week. A number of vessels have been chartered to carry lumber from the Sound and Columbia river to the United Kingdom and the majority of these will no. doubt load at least part cargo of pig for the return trip. Several inquiries have been made by the jobbing firms for return cargo rates on iron and these are expected to result in substantial orders before many days. Little iron is on the sea at the present time, except that coming from the plants in China and the southern brand is being used extensively. The foreign iron is practically all gone from the market.

We quote in gross tons foreign iron, ex-ship Puget sound or Columbia river, domestic f. o. b. Pacific coast terminal, as follows:

	Prompt.	Second quarter.
No. 1 Glengarnock	$24.50	$24.50
No. 1 Eglinton	23.50	24.00
No. 1 English Jarrow	23.50	23.50
No. 1 Chinese Hanyang	23.50	23.00
No. 1 Cleveland	23.50	23.50
English Doncaster	23.00	23.00

Finished Material.—Continued railroad activity gives a healthy tone to the finished material market in this section, and both mills and jobbers are looking for some strong buying before the close of the month. More and more orders are being placed in this section instead of the material being transported from the eastern mills and there is every indication that the placing of orders here will increase. The Puget sound industries are just getting out of the infant class and many of them are improving their plants by building additions or the installation of more machinery.

Trading in Pig Iron Light, But Prices Are Apparently Firm.

Birmingham, Feb. 14.

Pig Iron.—The trading in this market during the past week was very light comparatively, although the status of prices is believed not to have been affected. Practically all interests adhere firmly to a schedule of $11 per ton, Birmingham, for prompt shipments or nearby deliveries, with tonnage for delivery during the remainder of the first half available with probably only three concerns at that price. The inquiry during the week represented practically all quarters of the foundry trade and considerably more interest was manifested in deliveries further advanced than July 1. In several cases, prices were requested on tonnage to cover the remainder of this year, but such requests have hardly had serious consideration as it is understood that none of the southern producers have opened their order books for any tonnage to be delivered after the first half. Of the inquiries now pending which promise to result in sales during this week, the requirement of a stove manufacturer, which is 1,750 tons of Nos. 2 and 3 foundry for shipment during the remainder of the first half, is probably the most attractive. A manufacturer of cast iron pipe is in the market for a round tonnage to be delivered during the next six months and several small lots of low grades and high silicon iron are pending. The sales reported so far this week consist of a lot of 300 tons of No. 2 soft for shipment within the next 90 days; 200 tons for delivery during the first half, and two lots of 100 tons each for comparatively early shipment all at $11.

METAL MARKETS

St. Louis.

Feb. 13.

Zinc and Lead.—A top price of $45 a ton was realized for zinc blende in the open market in the Missouri-Kansas-Oklahoma district last week, on an assay base of $41.50 for 60 per cent lots, ranging down to $36 a ton for second grade qualities. The market was decidedly stronger than during the preceding week, and indications point to still better prices for the present week.

The price for contract ore was $39.29 a ton, with an average spelter market for the previous week of 5.27c. On a spelter market of 5.345, the contract price will be $39.93 this week. The top price paid for calamine was $26 a ton, with 40 per cent grades selling at from $20 to $23 a ton. The best price reported to have been paid for lead was $56 a ton. Pig lead was quiet at East St. Louis today at 4.30c, while spelter was quite firm and active at 5.35c to 5.40c.

New York.

Feb. 14.

Tin.—While the New York metal exchange was closed on Monday, the anniversary of Lincoln's birthday, the foreign syndicate manipulated a violent advance in prices from the closing figures of last week. The net gains for spot and futures, during Monday's session of the London exchange were £11 10s, on total transactions of 1,750 tons. A further advance took place today of £4 10s in spot and £3 10s in futures on trades, aggregating 1,060 tons, making a total gain of £23 5s in spot, and £21 10s in futures from the low prices reached last Thursday, when spot sold at £171 5s and futures at £171. In the New York market, today, spot tin sold at 45.12½c. This is about 3c above the domestic equivalent of the London closing and is the highest price that the metal has touched since 1906. This premium is caused by a local scarcity of spot Straits tin, which, it is said, is controlled by two or three large interests here. Domestic consumers have bought very lightly since the middle of last week and traders have also as a rule held aloof from the market. Spot and futures closed in London at £194 10s and £192 10s, respectively. The arrivals of tin since Feb. 1, aggregate 1,930 tons, and there are 1,770 tons afloat.

Copper. — A somewhat better outlook for finished copper material has stimulated the market for the metal to some extent, but the volume of buying is still very small, and prices unchanged. It is reported that sales aggregating about 12,000,000 pounds of copper wire have been contracted for since the first of the year, and other sources of consumption have felt improvement also. Buyers, however, seem not to feel anxious regarding their needs during the next few months, and are only committing for a short time ahead. Electrolytic can be had a shade under 12.50c, delivered 30 days, and 12.37½c, cash, New York, over most all counters. Lake copper is nominally 12.62½c to 12.75c. The London market closed dull at £55 for spot and £55 13s 9d for three months. The exports since Feb. 1 have been light, the total to date being only 8,590 tons.

Lead.—Dealers are looking for a more stable market from now until the spring season closes. Some lots were offered at 4.45c last week, but there is less indication of willingness to shade the quotation of the leading interests, which remains at 4.50c in New York.

Spelter. — The price keeps firm at 5.55c in New York, but there is not much demand that is noticeable. Sentiment favors an advance, should any change develop soon.

Antimony.—Cookson's antimony has been offered at 8c in this market, by brokers, but the makers' quotation continues at 8.25c. Hallett's is 7.75c, and Hungarian is 7.12½c to 7.25c. The demand for all grades is light.

Chicago.

Feb. 14.

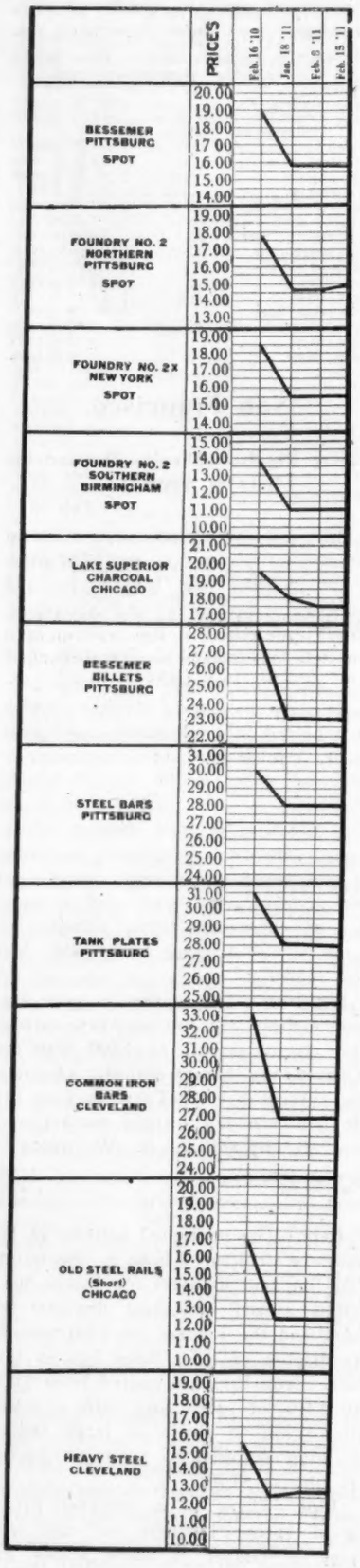
New Metals.—Tin has declined 2½c, following the break in the eastern market. It is expected that lower prices of tin will encourage purchasing by consumers and they may be induced to show more interest in their future requirements than has been the case heretofore. The net result of the week's operations in spelter leaves the price of this material about 5 cents lower. Business in copper and lead continues good.

We quote, dealers' selling prices, f. o. b. Chicago, as follows: Lake copper, carload lots, 12⅞c; casting, 12¾c; smaller lots, 1¼c to ⅜c higher. Spelter, car lots, 5.35c to 5.40c; lead, desilverized, 4.45c, in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $7.50 list, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 38½c; Cookson's antimony, 10c; other grades, 9c to 10c.

Old Metals.—The old metal market has not shown much change during the past week. Brass foundries are purchasing brass and copper in fairly encouraging quantities. Tin products have weakened somewhat on account of the sensational decline in pig tin.

We quote, dealers' selling prices, f. o. b. Chicago, as follows: Copper wire, 12½c; heavy copper, 12¼c; light copper, 11¼c; heavy red brass, 11c; heavy yellow brass, 9c; light brass, 7c; No. 1 red brass borings, 9¼c; No. 1 yellow brass borings, 6¾c; brass clippings, 8½c; tea lead, 3.80c; lead scrap, 4¼c; zinc, 4.60c; tin pipe, 37c; tin foil, 31c; pewter, 27c; electrotype plates, free from wood, 4c; electrotype dross, 3c; stereotype plates, 4½c; stereotype dross, 3¼c; linotype dross, 3¼c; prime slab zinc dross, $75 per ton.

PRICE CHART



STEEL TRADE RELATIONS

With South American Republics

Discussed by President Farrell of the United States Steel Corporation

Dealing with the export trade in all its different phases with the knowledge and experience that come with many years of active study and labor in a large capacity, James A. Farrell, president of the United States Steel Corporation, addressed the conference of the International Union of American Republics at Washington, Feb. 13. Mr. Farrell spoke in part, as follows:

As anyone who studies the progress of nations can perceive, the producing capacity of the United States has reached a point far exceeding the consumption, and the ratio of excess is assuming greater proportions each year. It is, therefore, imperative for the manufacturers of this country to look beyond its borders for markets wherein they can profitably dispose of their manufactures, and naturally, our geographical position points to the vast country lying to the south of us as a market which should enable us to secure a portion of the trade commensurate to our position as one of the foremost producing nations.

Advocates Fair Dealing.

The countries comprising what is commonly called "Latin America" should be drawn closer to us by ties of friendly relation and brotherhood, cemented by a generous exchange of commodities through the peaceful channels of trade and commerce. As fair dealing is the only foundation upon which a sound and successful enterprise can be established, none but those of undoubted character and business ability should be sent to represent American industrial enterprises. In our relations with Latin America, this thought should be uppermost in the minds of those of our merchants who would seek a market in those countries.

The growth of our country's trade with the Latin-American Republics furnishes a striking example of what can be accomplished by commercial friendship and co-operation. It is beyond the scope of this address to do more than briefly outline the nature and value of the trade between us.

The establishing of American banking facilities and American steamship lines are incidental matters which will be evolved in the course of time.

The completion of the Panama canal will give a wonderful impetus to Pan-American trade. It is impossible, at this time, to fully estimate the benefits that will accrue to the manufacturing and industrial interests of the United States and Latin America. We are justified in believing that it will undoubtedly prove one of the most profitable investments ever made by our government, aside from its being a national necessity.

Adverse Trade Balance.

The United States government statistics for the calendar year 1910, recently published by the Department of Commerce and Labor, show that our trade with the countries embraced in the Pan-American Union, in round figures, were as follows:

Imports	$394,000,000
Exports	260,000,000
Balance against United States	134,000,000

This adverse balance is largely accounted for by the figures of our commerce with Brazil, which were, in round numbers:

Imports	$103,000,000
Exports	25,000,000
Balance against United States	78,000,000

While I have not at hand the latest statistics of the total amount of the trade of other countries with those embraced in the Pan-American Union, it will be interesting to note the comparison of the figures for steel products alone, for which class of trade reasonably close approximations are obtainable. The comparison is as follows:

In 1910, the manufacturers of the United States exported to the Pan-American Union steel products of an aggregate value of $21,000,000, as against a total of $35,000,000 exported by European manufacturers to the same countries.

The delusion exists that the trade of the United States with foreign countries is carried on within narrow limits, among others, the claim being made that we do not extend credits, and, in consequence, a large volume of trade goes to Europe which would come here, were we to grant credits of six to nine months. In the great majority of cases, credits such as referred to are granted only against acceptance of drafts, with interest added for the accommodation; but the bulk of the business done with the best buyers, wherever found, is either against bank credit, or cash against shipping documents. Wherever there is a basis for credit, American manufacturers will be found as ready to grant it as Europeans.

Honorable Methods Necessary.

In the development of our trade, we should endeavor to obtain our full share of business by fair and honorable means and with due regard to the rights of those with whom we are trading. The saying, "Competition is the life of trade" is a truism to which daily utterance is given. Were this changed to *"Fair* competition is the life of trade," it would more correctly represent the basis upon which sound and lasting business relations may be established.

RECIPROCITY

Would Help Steel Trade—Very Encouraging News.

New York, Feb. 15. (By wire.)

Continued undiminished flow of new business in practically all lines is strengthening the opinion of some leading makers that a turn in the situation has come. Daily bookings are holding up strongly, and a good feature of improvement is the well diversified character of demand. There is a bright outlook for a big year in tin plate, as inability of Welsh makers to meet increased demands in foreign markets is directing a greater tonnage to American mills from such sources.

Operations of the leading interest are now 90 per cent tin plate mills and 65 per cent of sheet capacity, which is also gaining. Export trade is heavy, particularly in the far east. The new tariff in Japan, effective in July, is causing many anticipatory orders for steel products to be placed in this country.

There is some improvement in pig iron in the south.

Leading steel manufacturers believe reciprocity treaty is sure of ratification and believe it will materially help the American steel trade.

CAR BUILDERS

Preparing for Heavy Business—Steel Rail Orders.

New York, Feb. 15. (By wire.)

The Western Maryland has placed 10,000 tons of rails with the Carnegie Steel Co. The Illinois Steel Co. has booked 1,900 tons from the Peoria & Pekin Union and 2,000 tons scattering. The St. Paul order for 60,000 tons, which will go to western mills, is not yet placed. The Grand Trunk tonnage, 7,500 for this country and 61,000 tons for Canada, is still pending.

Steel companies are arranging for additional protections on car material for contracts not yet announced and for the first time in many months full prices are acceptable to buyers.

The recent price advance of about 2½ per cent by enameling and stamping interests has been followed by a heavy demand for these products, which is showing effect in the sheet and tin plate market. Some eastern bar iron makers are withdrawing old price schedules, which have been very low, ranging from 1.30c up, delivered. Steel bars are still slow in the east. Structural tonnage is not increasing with some other lines and leading fabricator continues to operate at 75 per cent.

THE PERMANENT MOLD

Discussed by New England Foundrymen's Association.

Edgar Allen Custer, Tacony Iron Co., Tacony, Philadelphia, Pa., presented a paper entitled "The Permanent Mold," at the regularly monthly meeting of the New England Foundrymen's Association, held at the Exchange Club, Boston, Wednesday, Feb. 8. Mr. Custer described his process of producing gray iron castings in permanent molds and covered some of the features of this practice contained in articles on this subject which have already appeared in THE IRON TRADE REVIEW. An interesting record of the output of a battery of permanent molds used in the production of pipe fittings weighing 34 pounds each, showed a production of 123 castings from 9 to 10 a. m., with a loss of only two pieces; 119 castings from 10 to 11 a. m., with a loss of one piece, and 146 castings from 11 to 12 a. m., with a loss of only one piece. Regarding a statement made by Mr. Custer in 1910 that this process was not dependent upon skilled labor, the speaker stated that to prove this assertion, on April 21, last year, 18 men were hired from the street; of this gang 16 were unable to speak English, while some of them had never been in a foundry before. After being in the shop two days the men were placed at work on the battery of permanent molds and three experienced workmen were added to the gang. The shop was then temporarily placed in charge of the representatives of another concern, who kept a record of the number of castings produced, cost, etc. A total of 37 molds were used and the average molding cost of these castings when made in sand was 6 cents each when figured on a piecework basis. The results of this test follow:

	Number hours worked.	Number castings made.	Cost per piece.
Monday	7	896	$0.023
Tuesday	10	1,419	0.021
Wednesday	10	1,767	0.0169
Thursday	10	1,972	0.0152
Friday	10	2,174	0.0138

The cost of molders' labor for these castings when made in sand was $9.02 per ton, while on the last day of this test the molding cost was only $2.14 per ton. In addition, the cost of cleaning the castings was entirely eliminated.

Regarding the life of permanent molds, Mr. Custer said that the only places where the molds disintegrate are in the runners and gates. The matrix of the mold, however, never shows any signs of wear or crumbling. After making from 7,000 to 10,000 castings it is the general practice to renew the gates by inserting new blocks. The cost of these repairs is generally 10 per cent of the original cost of the molds. In a single mold 21,000 castings, weighing 10 pounds each, have already been made and the matrix today still shows the original tool marks. In conclusion, Mr. Custer said: "The life of the mold does not depend so much upon the number of castings that are poured into it as upon the number of times it is allowed to become cold. Working a mold continuously—day and night—will quadruple the number of castings that may be made before repairs are required."

Move Headquarters to Manitowoc, Wis.

The Aluminum Goods Mfg. Co., a consolidation of several plants in Wisconsin and New Jersey, which recently went into the control of the Vits interests at Manitowoc, Wis., has decided to make Manitowoc the headquarters and main office. George Vits was elected president and general manager. Joseph Koenig and J. F. Magee, officers of the Aluminum Goods Co. of Two Rivers, Wis., were elected vice president and superintendent of factories, and secretary and treasurer, respectively. While the New Jersey and the Two Rivers factories will be continued for some time at least, the Manitowoc plant will be enlarged at once, $65,000 having been appropriated for the purpose of constructing a new building. The eastern plant will gradually be dismantled and the equipment used at the main factory in Manitowoc.

Degree for John Fritz

John Fritz, the veteran iron master, of South Bethlehem, Pa., was the recipient of the honorary degree of doctor of science from Temple university, Philadelphia, at the celebration of the founders' day of the institution Feb. 11. At the testimonial dinner given Mr. Fritz at Philadelphia, Nov. 17 last, by iron and steel manufacturers, advance announcement was made of the decision of the university authorities to confer this degree.

The United States Cast Iron Pipe & Foundry Co. has declared the usual quarterly dividend of 1¾ per cent on its preferred stock, payable March 1.

ANNUAL REPORT

Of J. G. Brill Co., Philadelphia, for Past Year.

The annual report of the J. G. Brill Co., Philadelphia, for the period ending Dec. 31 last was recently presented to stockholders. In presenting the report, President James Rawle said:

While the output increased over the years 1908 and 1909, the depression of these years, especially 1909, was reflected in the output of the first part of 1910. Though business was then beginning to return to a somewhat normal condition, much of the work turned out early in the year represented contracts taken under strong competition in the latter part of 1909. The output for the latter part of the year showed an improvement, and the work now on hand has been taken on a satisfactory basis.

On Dec. 31, 1910, your combined companies had orders in process of completion amounting to $2,046,218, with a much improved outlook for profitable work.

The output from the five plants owned and operated by the J. G. Brill Co. for the 12 months ended Dec. 31, 1910, amounted to $5,960,778. For comparison the amounts of the combined sales of the five companies for the four years last past are here given: 1910, $5,960,778; 1909, $4,261,204; 1908, $3,845,173; 1907, $9,211,825.

At a directors' meeting held Jan. 27, 1911, the regular quarterly dividend on the preferred stock at the rate of 7 per cent per annum, amounting to $80,150, was declared, and was paid Feb. 1, 1911.

Comparison of the income accounts for the past two years follows:

	1910	1909
Total sales	$5,960,778	$4,261,204
Operating expenses	5,519,822	4,075,979
Manufacturers profit	440,955	185,225
Other income	.....	52,909
Total income	440,955	238,134
Depreciation	114,623	107,350
Surplus	326,332	130,784
Previous surplus	1,085,004	1,339,449
Total surplus	1,411,336	1,470,233
Less adjustment	62,797	64,629
Balance	1,348,539	1,405,604
Dividends	320,600	320,600
Surplus	1,027,939	1,085,004
Less	429,122	.....
*Net surplus	598,816	.....

*Less part of this combined surplus represented by surplus of Wason Mfg. Co., and now set aside for permanent surplus of that company as an addition to its working capital.

The Foster Bolt & Nut Mfg. Co., Cleveland, is erecting a two-story brick addition to its shipping department. The Foster company is now manufacturing a full and complete line of stove bolts, stove rods and rivets.

The foundry and machine shop of the Robertson Machinery Co. Ltd., Welland, Ont., is offered for sale by tender of the assignee, bids to be in by Feb. 21. The assets are valued at $23,544.

LOOKING BRIGHTER

In the Lower Susquehanna Valley—Bills in the Pennsylvania Legislature.

Harrisburg, Pa., Feb. 14.

Things are beginning to look brighter in the lower Susquehanna valley since the first of the month, and indications are not wanting at some of the mills that production will be increased extensively before March begins. The Pennsylvania Steel Co. has ordered two additional open-hearth furnaces of 40 tons capacity to be put back on the active list and repairs to No. 2 Steelton furnace are being rushed.

In this city, the Lalance & Grosjean tin plate mills will resume in the hot mills on Feb. 20, and other plants are planning more activity.

Similar reports are received from Lebanon and Columbia.

Interest here largely centers in the bills relating to the iron and steel industry, which have appeared in the legislature. An employers' liability bill of drastic character has appeared and will be opposed in committee and an eight-hour law has likewise appeared, but with a poor show of being enacted.

The legislative commission in charge of the administration corporation taxation bills has not yet reported its measures, but a tax of at least a mill on the dollar of capital engaged in manufacturing, now exempt from taxation, is certain.

Will Enlarge Pittsburg Bridge Works

Plans are being prepared for enlarging the capacity of the Des Moines Bridge & Iron Co.'s plant at Neville Island, on the Ohio river, near Pittsburg. The controlling interest of this company is understood to have been disposed of by the original owners, and B. N. Moss has severed his connection with the company. The newly-elected officers are: President, E. W. Crellin; vice president, G. A. Smith; secretary and treasurer, W. H. Jackson. General offices will be opened in the Curry building, Pittsburg. The Des Moines, Ia., plant will be maintained.

New Winchester President

Thomas G. Bennett has resigned as president of the Winchester Arms Co. and has been succeeded by George E. Hodson. Winchester Bennett has been elected first vice president; Harry S. Leonard, second vice president, and A. I. Ward, secretary. The directors created a new office, that of consulting director, and T. G. Bennett was chosen to fill it. At the annual meeting of the stockholders the following directors were elected: Thomas G. Bennett, George E. Hodson, Arthur H. Hooper, Henry Stoddard, Winchester Bennett, Victor M. Tyler and Daniel H. Veader.

Installing Additional Power Facilities

Mackintosh, Hemphill & Co., Pittsburg, have awarded a contract for electric power to the Allegheny County Light Co., Pittsburg. The company has installed at its Twelfth street, Pittsburg, plant two 400-horsepower motor generator sets for generating direct current to operate cranes and variable speed direct current motors, and 400 horsepower in constant speed induction motors to operate line shafting and constant speed machines. The capacity of the power plant to be abandoned is 750 horsepower, the new capacity being 1,200 horsepower. Had the capacity of the steam power plant been enlarged, any further extensions would have entailed costly alterations, but under the present arrangements, future increases in capacity can be made by the addition of the necessary motors.

Offices Removed

The New York offices of the Lackawanna Steel Co. have been removed from room 1814, 2 Rector street, to room 1826 in the same building. Since the recent removal of the general offices of the company to Buffalo, the New York offices are devoted largely to district sales matters, in charge of H. H. Barbour as district sales agent, although several other departments still retain representation at the same location.

Welsh Tin Plate Trade

Swansea harbor trust returns for the week ending Jan. 28, with comparisons, follow:

	Week of Jan. 28. Boxes.	Previous week. Boxes.	Corresponding week last year. Boxes.
Received	105,155	85,373	91,086
Shipped	22,799	99,570	63,379
Stocks	271,355	188,999	140,953

The New Jersey Zinc Co. has formulated a plan for pensioning employes of its Palmerton, Pa., works, who have been in the employ of the company over 20 years.

The Pratt & Whitney Co. declared the regular quarterly dividend of 1½ per cent on its preferred stock, payable Feb. 5.

ELEVENTH REPORT

Of American Iron & Steel Mfg. Co. for Year Ending Dec. 31.

The American Iron & Steel Mfg. Co., Lebanon, Pa., has issued its eleventh financial report, this for the year ending Dec. 31, 1910. The general balance sheet as of Dec. 31 compares as follows:

Assets:—	1910	1909
Cash	$1,025,062	$ 569,102
Bills received	11,258	11,553
Accounts received	576,322	673,303
Inventory	1,587,643	2,143,183
Insurance and taxes	6,237	7,300
*Real estate	4,936,635	4,870,167
Total	$8,143,158	$8,301,608
Liabilities:—		
Preferred stock	$3,000,000	$3,000,000
Common stock	2,550,000	2,550,000
Wages accd.		90,998
Accounts payable		134,729
Undivided profits	2,593,158	2,525,881
Total	$8,143,158	$8,301,608

*And plant equipment, less allowance for depreciation.

In presenting the report President James Lord said:

As compared with the previous year, the demand for our products was greater, with prices much lower than prevailed during the last half of 1909. During the year, a special dividend of 2 per cent, amounting to $111,000, was paid in addition to the regular dividend of 5 per cent. Additions were made to plants and equipment amounting to $116,468.76. The allowance for depreciation of plants and machinery now amounts to $855,000.

Will Build Factory

The Wise Furnace Co., Akron, O., has purchased three acres between Lincoln and Forge streets and the railroad, on which it plans to build a modern plant, plans for which are being drawn. Beside a factory building, there will be machine shops and warehouse. Work will be started early in the summer and construction is to be completed by the first of the year.

Branch Warehouse

The Empire Iron & Steel Co., of Niles, O., has established branch warehouses in Chicago at 22 Lake street in order to satisfactorily handle the increased demand for its products through the middle west. This is an addition to the company's well regulated distributing facilities. Orders received by the Chicago will receive the same attention accorded by the home office.

Johnston & Jennings Co., Cleveland, recently closed some large contracts for wire fence machinery. This concern reports a lively inquiry in this line of late.

Personal

C. L. Cornell was elected a director of the Niles-Bement-Pond Co. at the recent annual meeting, in succession to Alexander Gordon, deceased.

Frank Eaton, resident partner of Hickman, Williams & Co., accompanied by Mrs. Eaton, will leave Feb. 22 for a month's pleasure trip to Panama.

Wm. McLauchlan, of Pickands, Mather & Co., Cleveland, started Tuesday for California, accompanied by Mrs. McLauchlan, on a month's sojourn.

C. B. McElhany, formerly of the Colorado Fuel & Iron Co., Denver, Col., has been appointed sales manager for the wire department of the Cambria Steel Co., with offices at Johnstown, Pa.

R. T. McCormick, formerly sales manager for the Petroleum Iron Works, in Pittsburg, has been made general manager of sales with headquarters at the company's general offices at Sharon, Pa.

Banks Hudson has resigned as blast furnace manager of the Alabama Consolidated Coal & Iron Co., at Gadsden, effective March 1. He will on that date enter the employ of the Lake Superior Iron & Chemical Co.

John Birkinbine, the Philadelphia engineer, addressed the Philadelphia association of Foundry Foremen at the Manufacturers' club in that city, Tuesday evening, Feb. 14, on "The Early History of Iron Making."

F. H. Teagle, who has for some time been connected with the American Ball Bearing Co., Cleveland, has been promoted to the position of general manager of the concern, taking the place vacated by Phillip Dorn.

Capt. Joseph Hodgson, who has been principal operating man for the iron ore mines of the Breitung estate in the Lake Superior region, has been appointed general superintendent. His assistant will be W. B. Bauder.

Thomas A. Edison, the inventor, celebrated his sixty-fourth birthday anniversary, Feb. 11. Mr. Edison spent the day quietly at his home at Llewellyn Park, N. J. He was recipient during the day of many letters and telegrams of congratulations.

Charles S. Simpson, for eight years superintendent of the Burt-Sellers mine at Hibbing, Minn., and in the employ of the Oliver Iron Mining Co. for 14 years, has resigned to remove to California to benefit the health of members of his family.

Officials of the operating and engineering departments of the Pittsburg Coal Co. gave a farewell dinner at the Hotel Henry, Pittsburg, Feb. 11, in honor of John D. Sharpe, who has resigned as manager of mines in the thin-vein district to become manager of mines of the Amalgamated Asbestos Corporation of Canada.

Major H. Ashton Ramsey, contracting manager of the American Bridge Co., at Baltimore, has retired and has been succeeded by H. A. Warren, of the New York office. John Towne, contract manager of the American Bridge Co., at Portland, Me., has also resigned. Mr. Towne has been identified with the bridge building trade for many years.

B. N. Moss, secretary and treasurer of the Des Moines Bridge & Iron Works, Des Moines, Ia., has retired after 17 years of service. He will leave March 1 on a pleasure trip to Panama and California. He has disposed of his interest in the company to E. W. Crellin, who has been elected president, and to W. H. Jackson, who has been chosen secretary and treasurer of the company.

C. M. Crook, general manager of the Bessemer Limestone Co., Youngstown, O., has retired on a year's leave of absence to benefit his health, which has been poor for several years. He is succeeded by C. C. Blair, formerly secretary of the company. J. G. Butler Jr. has been chosen chairman of the board, being succeeded as president by John Tod, and R. C. Steese was elected vice president. C. S. Crook, who has been assisting his brother, also retires.

Death of Charles R. Rhodes in Pittsburg

Charles R. Rhodes, aged 44, general manager of the Pittsburg Valve Foundry & Construction Co., died Feb. 9, at the family residence, Jackson street, East End, Pittsburg, after a brief illness. The announcement of Mr. Rhodes' death was a shock to his many friends in the iron and steel business, only a few having known of his sickness. He was in the best of health until about three weeks ago, when he was stricken by heart trouble at the office. His condition was not regarded as serious until a few days before his death. Mr. Rhodes was born at New Castle, Pa., and was a son of James Rhodes, a well known manufacturer. At an early age he became identified with the foundry industry, and for a number of years was connected with some of the smaller plants in the Pittsburg district. When the Pittsburg Valve Foundry & Construction Co. was organized, some years ago, Mr. Rhodes was made the general manager of the company. He was also identified with the various foundrymen's associations. He was a trustee of the Highland Presbyterian church, a member of the Stanton Heights Golf Club, and a Mason. He leaves a widow, three sons and one daughter.

Obituary

Samuel Hallett Moore, formerly an iron manufacturer of Milwaukee, and father of Edward Y. and V. Mulford Moore, Cleveland, manufacturers, died at his home in Cleveland on Feb. 8, aged 89. In 1873, Mr. Moore was one of the founders of the firm S. H. & E. Y. Moore, heavy hardware manufacturers of Chicago. In 1888, he terminated his stay in that city and moved to Milwaukee, where he helped his sons in the establishment of the Moore Mfg. & Foundry Co. In 1894, Mr. Moore moved to Cleveland, where his sons helped found the Chisholm & Moore Mfg. Co. With this concern Mr. Moore had no active connection.

Louis R. Alberger, president of the Alberger Condenser Co. and the Alberger Pump Co., died recently at his home in New York after a short illness, aged 47. Mr. Alberger was one of the leading engineers of the country in pumping machinery and condensing apparatus. Upon his graduation from Yale, he became interested in the manufacture of vacuum process specialties for salt works. Later he became connected with the Henry R. Worthington Pump Works, in Harrison, N. J. In 1901 he organized the Alberger Condenser Co., and established a plant at Newburgh, N. Y. Later he organized the Alberger Pump Co.

Will Move to Columbus

Announcement is made by the Brightman Mfg. Co., Shelby, O., that it will remove its plant at Shelby, which was damaged by fire Dec. 19, to Columbus, O., where it will be rebuilt. It expects to have the plant operating completely in from three to four months.

Officers Re-elected.—At the recent annual meeting of The Globe Seamless Steel Tubes Co., Milwaukee, the following officers were re-elected: President, F. W. Renshaw; vice president, secretary and treasurer, Lawrence Fitch; general superintendent, George J. Thust. In noting this election last week, an error crept into the report as published.

Imperial Brass Mfg. Co., Chicago, has certified to an increase in capital stock from $75,000 to $100,000.

IRON AND STEEL SECURITIES

The trend of events on the New York stock exchange last week strengthened the growing disposition to take a more cheerful view of the outlook for business this year. The report of New York banks for the week was regarded as satisfactory.

Monday stocks opened higher and strong, but in the afternoon sold off, previous gains being wiped out; the cotton market declined sharply and closed at the lowest. The market on Tuesday was apathetic in the earlier part of the session, but closed strong and higher; the wheat market was weak and lower; cotton closed steady, following a further decline. Wednesday, the market was dull and prices averaged lower; wheat declined to a new low price on the movement; further curtailment in the cotton mill operations in New England is said to be contemplated; copper producers reported an increase of over 20,400,000 pounds of unsold metal for January. Thursday the market was dull but recovered from early weakness and closed steady; irregularity was noted in the commodity markets, the most decided change being a decline in coffee. Friday was the dullest day of the year and prices averaged slightly lower; both wheat and corn declined. Saturday shares were dull, however, closing with a fairly firm undertone.

The tone of the call money market for the week was uniformly easy, ranging from 2½ to 1½ per cent. An improvement in demand characterized time money. The report of the actual condition of clearing house banks showed: Loans increased $12,360,500; deposits increased $13,881,200; reserve increased $1,840,800; surplus decreased $1,636,875; and the percentage of reserve 27.6, compared with 27.8 the previous week. Non-member banks and trust companies reported: Loans increased $5,241,500; net deposits increased $5,595,600; and the percentage of reserve 17.05, an increase of 0.1. The fortnightly railway bulletin recorded net surplus of idle cars on Feb. 1 as 155,068, an increase in idle cars of 40,248, or about 35 per cent; over 80 per cent of the car surplus increase was in the eastern and middle sections of the country. Commercial failures for the week were 276, compared with 342 the preceding week, and 289 the corresponding week last year. Bank clearings in the United States showed a decrease of about 13 per cent from the preceding week, and an increase of 4.3 per cent over last year. Shares were sold to the number of 2,521,800, compared with 3,964,700 the preceding week, and 4,788,600 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $15,346,000, compared with $14,608,000 the preceding week, and $16,975,000 the corresponding week last year.

	Closing Quo. Feb. 11	Changes in week	Annual Meeting date 1911		Stock Outstanding	Basis	Dividend Last Dividend	Date Last Div. Pay.
Allis-Chalmers	8	— ½			$19,820,000		.....	.....
Allis-Chalmers, pr	32½	— ½	Nov.	2	16,150,000	7 cum.	1¾ Q.	Feb., 1904
American Can	9¾	— ⅛	Feb.	1	41,233,300		1¾ Q.	.....
American Can, pr	81¾	.....			41,233,300	7 cum.	1¾ Q.	Jan., 1911
Am. Car & Fdy	53¾	+ ¾	June	29	30,000,000		½ Q.	Jan., 1911
Am. Car & Fdy., pr	118	— ⅛			30,000,000	n. c.	1¾ Q.	Jan., 1911
American Loc	41⅛	— ⅛	Oct.	17	25,000,000	5	1¾ Q.	Aug., 1908
American Loc., pr	110	.....			25,000,000	7 cum.	1¾ Q.	Jan., 1911
American Ship	77½	+2½	Oct.	11	7,600,000	4	1 Q.	Sept., 1910
American Ship, pr	111⅜	+ ⅜			7,900,000	7 cum.	1¾ Q.	Jan., 1911
Am. Steel Foundries	50½	+3¾	Dec.	7	17,184,000		1¼ Q.	Feb., 1911
Barney & Smith	20	.....	June	6	2,000,000	4	1 Q.	June, 1908
Barney & Smith, pr	85	.....			2,500,000	8 cum.	2 Q.	Dec., 1910
Bethlehem Steel	33⅜	.....	April	4	14,862,000		.....	.....
Bethlehem Steel, pr	62½	—1¼			14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	45½	+ ⅞	Mar.	21	45,000,000	5	1½ Q.	Feb., 1911
Cambria Iron	46	.....			8,468,000*	4	2 S. A.	Oct., 1910
Chicago Pneumatic Tool	49	+1¾	Feb.	20	6,485,800	4	1 Q.	Jan., 1911
Colorado Fuel	35¼	— ¼	Oct.	16	34,235,500		1¼ Q.	Apr., 1902
Crucible Steel	13	— ⅛	Oct.	18	24,578,400		3½.	.....
Crucible Steel, pr	80	.....			24,463,500	7 cum.	1¾ Q.	Dec., 1910
Empire Steel	5	.....	Feb.	22	1,254,770		.....	.....
Empire Steel, pr	55	.....			2,500,000	6 cum.	2 S. A.	Jan., 1911
Fay & Egan	70	.....	Feb.	21	1,000,000	6	3 S. A.	Feb., 1909
Fay & Egan, pr	110	.....			1,000,000	7 cum.	1¾ Q.	Nov., 1910
General Electric	155½	+ ¼	May	9	65,179,600	8	2 Q.	Apr., 1911
Harbison-Walker	36	+1	Jan.	16	18,000,000		½ Q.	Dec., 1910
Harbison-Walker, pr	95	.....			9,600,000	6 cum.	1½.	Jan., 1911
International Pump	43¾	+2⅜	Dec.	12	17,762,500		1 Q.	Nov., 1910
International Pump, pr	88⅞	+3⅜			11,350,000	6 cum.	1½ Q.	Feb., 1911
Lackawanna Steel	41	+1	Mar.	8	34,978,000		.....	.....
Lake Sup. Corp.	30½	—1	Oct.	4	40,000,000		.....	.....
New York Air Brake	73	—3	Mar.	8	10,000,000	8	1½ Q.	Jan., 1911
Niles-Bement-Pond	94	—4	Feb.	8	8,500,000	6	1½ Q.	Mar., 1911
Niles-Bement-Pond, pr	104	.....			2,000,000	6 cum.	1½ Q.	Mar., 1911
Otis Elevator Co	52	+3	Mar.	20	6,375,000	3	1½ S. A.	Oct., 1910
Otis Elevator Co., pr	96	.....			6,310,000	6 n. c.	1½ Q.	Jan., 1911
Pa. Steel	60	.....	May	8	10,750,000		.....	.....
Pa. Steel, pr	106½	.....			16,500,000	7 n. c.	3½ S. A.	Nov., 1910
Pittsburg Coal Co	21¼	+1⅛	Feb.	10	28,104,600		.....	.....
Pittsburg Coal Co., pr	72¼	+1¼			27,071,800	7 cum.	1¾ Q.	Jan., 1911
Pressed Steel Car	36	+1	Feb.	15	12,500,000		1 Q.	Aug., 1904
Pressed Steel Car, pr	98⅞	+ ⅝			12,500,000	7 n. c.	1¾ Q.	Feb., 1911
Pullman	161	.....	Nov.	8	120,000,000	8	2 Q.	Feb., 1911
Railway Stl. Spring	37	— ⅜	Mar.	2	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr	98½	—1			13,500,000	7 cum.	1¾ Q.	Dec., 1910
Rep. Iron & Steel	35	+ ¼	Oct.	18	27,191,000		.....	.....
Rep. Iron & Steel, pr	99¼	+ ¾			25,000,000	7 cum.	1¾ Q.	Jan., 1911
Sloss-Sheffield	55¼	+ ¼	Mar.	15	10,000,000	5	1¼ Q.	Sept., 1910
Sloss-Sheffield, pr	114½	.....			6,700,000	7 n. c.	1¾ Q.	Jan., 1911
U. S. Pipe & Fdy. Co	18	+2	June	28	12,106,300	2	1 Q.	Dec., 1910
U. S. Pipe & Fdy. Co., pr	55½	+1½			12,106,300	7 n. c.	1¾ Q.	Dec., 1910
U. S. Steel	81½	— ⅛	April	17	508,302,500	5	1¼ Q.	Mar., 1911
U. S. Steel, pr	119	— ⅛			360,281,100	7 cum.	1¾ Q.	Feb., 1911
U. S. Steel 5s	105⅜	+ ⅜			463,798,000	5	.....	.....
Va. Iron, Coal & Coke	66	+6½	Sept.	19	9,073,680		5. †	Oct., 1907
Westinghouse Electric	70	.....	July	26	3,998,700*		5¼ Q. **	Jan., 1911
Westinghouse Air Brake	144¾	+ ¼	Oct.	3	13,750,000*		5 Q. ‡	Jan., 1911

Par value of shares, $100, except those starred (*), $50.
**Includes 3½ per cent on back dividends.
†Stock.
‡Includes 1½ extra and 1 special.

Copper Stocks.

New York. — Amalgamated Copper closed 66, unchanged.

Boston.—Butte Coalition closed at 19, a net loss of ½; Calumet & Arizona closed 53½, a net loss of 1½; Calumet & Hecla closed 525, a net gain of 5; North Butte Mining closed 29⅞, a net gain of ⅞; Quincy Mining closed 68, a net gain of 1.

THE IRON TRADE REVIEW

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THE AVERAGE PAID CIRCULATION OF THE IRON TRADE REVIEW FOR THE ISSUES OF THE FOLLOWING MONTHS WAS:

February	5,703
March	5,754
April	5,793
May	5,827
June	5,842
July	5,864
August	5,875
September	5,895
October	5,955
November	5,993
December	6,026
January, 1911	6,058

February 16, 1911

Greater Stability in Ore Prices

We have received the following communication from one of the ablest blast furnace operators in the country. We believe that there is much foundation for his argument, which is ably presented. Since the panic of 1907, we have witnessed some wonderful demonstrations of what can be done toward preventing the ruinous competition which in earlier years resulted in many bankruptcies and other disastrous conditions. If, however, there is to be real stability in the iron trade, there must be a sound foundation, and that foundation ought to be stability of iron ore prices. Otherwise, we shall have a house built upon sand. If it be said that there are a few dealers in iron ore who will not co-operate with the others, we point to the fact that in finished materials there are also some manufacturers who have not acted in harmony with the vast majority. But we believe that what has been accomplished in finished lines can be accomplished in iron ore. We present this communication for the thoughtful consideration of all who are interested in establishing more satisfactory business conditions, not only in iron ore, but throughout the country.

Editor THE IRON TRADE REVIEW:

The suggestion as voiced in your issue of Jan. 26, that a more stable condition in the iron ore market is probably more desirable at this time than any other one thing, which could be produced by a clear understanding of the conditions, seems to the writer to merit much more than passing attention.

The peculiarities of the iron ore market make it differ from other parts of the great fabric of iron and steel making for the reason that practically at all times the independent furnace operator must purchase his ore an average of six or nine months in advance of the time he is going to use this material, and frequently the period is 12 months.

This ore must be contracted for in advance, so that the ore companies will run their mines and accumulate stockpiles during the winter months.

This, therefore, often places the furnace operator in a position where, at the beginning of the year, a reduction in the volume of his business seems clearly to indicate to him that he will carry ores over for that year. In every case, for a number of years, when this condition seemed to exist at the beginning of a new year, the price of pig iron commenced to slump and went down steadily until about the middle of the summer; in fact (unless there was an unusually large margin in pig iron and the country under boom conditions), it has gone below the cost of manufacture, and this only because a threatened reduction of 50 cents a ton in ore price to the furnace operator (being $1 a ton on pig iron) is a serious menace; and if he is making 20,000 tons of pig iron per month and would carry over a three-months' supply and the market in ore goes down 50 cents a ton, he is forced to take a loss of $60,000 on his raw material.

It therefore becomes the rule with the pig iron maker that if, on the first of January, a weakness in the general trade is apparent to such an extent that a reduction in ore is considered, he sells iron as fast as he can on a steadily declining market, each one vying with the other in cutting the price and trying to sell enough to cover the ores he has to carry over before it gets clear to the bottom on a reduced basis on ore.

In the spring of 1906, exactly this condition took place; but in the fall of 1906, after the slowing down of the general business of the summer and after the pig iron maker had taken his loss, the price steadily increased to the fall, and with it came an increase of 50 cents a ton in ore for 1907.

The year 1907 was a boom period and the price of pig iron remained high all that year; but in the spring of 1908, anticipating a reduction in ore, the price of iron steadily decreased owing more particularly to panic conditions than to anything else, and the consumption was so small that great ore piles were carried over in the furnace yards,—this at the highest price at which ore had been sold in the last ten years, the price having been made and ore bought in 1907 at the highest prices.

Owing to the reduced production during the summer of 1908, the price of iron picked up a little bit in the fall, but in January, 1909, we find No. 2 iron selling in northern Ohio at $15 per ton at the furnace. The discussion immediately took place as to what the price for 1909 ore was going to be, and the talk of reduction (although many operators favored holding the price) forced it down to about $14.50, in May, and ore was reduced 50 cents per ton.

General conditions then seemed to improve. The ore reduction was a fact, and pig iron, after a long deadlock between buyers and sellers, failed to go down. The public, watching the *baromter,* commenced again to buy finished materials. This buying, after a long wait, produced a wave of increased business. Political conditions seemed to be fixed, and the

price of pig iron improved some in the fall of 1909, reaching about $17.50 per ton in northern Ohio by December, 1909.

At this time, 1910 looked like a good year, and the buyers of ore placed their orders in the form of reservations without a price being fixed. This price, however, was shortly fixed by the ore companies increasing 50 cents a ton (or back to the 1907-08 basis), and before this fixed price was fairly established and fully understood the wave of increased consumption hesitated and slackened, and the price of pig iron commenced steadily to fall, and with the falling "Barometer of Pig Iron" the buyers held off and pig iron went down gradually and steadily all of the year 1910, selling in the middle of the year at $14.50 in northern Ohio, continuing downward until in November and December of 1910 $14 in northern Ohio seemed to be the price; this with the highest price of ores, labor and materials generally that the furnaces have had in many years; and consumption of nearly all finished lines followed in a steady decrease.

Now comes the query, "Are they going to reduce the price of ore for 1911 contracts?"

Pig iron today, it is generally admitted, is being sold below the cost of manufacture for the maker who buys his materials on the open market.

At recent meetings which have been held, the furnacemen were outspoken in their statements that they were running at a loss to get out from under large piles of ore. It is probable that by the opening of navigation there will be 10,000,000 to 12,000,000 tons of ore in the hands of the manufacturers of iron and steel, and this at the highest price paid in many years. A reduction of 50 cents a ton will cause a loss of many millions to these manufacturers, and if this reduction takes place, then it is probable after a period of deadlock between buyer and seller, that a resumption of buying will take place in the fall. Iron selling below cost must then improve, and the ore market probably will go up again. Then we likely will have again the same story of decline in iron to escape carrying over ore, and another decline in consumption following the barometer, and so on repeating itself.

It seems to be clearly demonstrated (with the exception of those periods of boom conditions which can offset any condition in cost of production) that the tendency of the iron manufacturers is to sell out as fast as they can from January to the opening of navigation on a falling market, each trying to beat the other in getting orders enough to get rid of all their ore so they may be sure that they will not have to mark off a loss on their ore piles.

The following table shows the prices of ores which have been generally quoted for the last five years, together with the average for each:

	Old Range.		Mesaba.	
	Bessemer.	Non-Bessemer.	Bessemer.	Non-Bessemer.
1906.....	$4.25	$3.70	$4.00	$3.50
1907.....	5.00	4.20	4.75	4.00
1908.....	5.00	4.20	4.75	4.00
1909.....	4.50	3.70	4.00	3.50
1910.....	5.00	4.20	4.50	4.00
Average	$4.75	$4.00	$4.40	$3.80

It would seem to the writer that, if the ore companies could establish the average of these prices by the sentiment that the ore in the ground is placed there by nature, and is not subject to variations in its value by the cost of raw materials, that until new ranges or large developments occur which will change the entire ore mining situation, that the price would be maintained steadily at the average here given for a *period of some years;* that there would be *no increase* and *no decrease;* that the material is worth that and if it is not worth that it would be left in the ground for future use. This course would greatly aid in producing stability in the pig iron market.

If the furnaceman knew that, if he carried over from one season to another a considerable stock of ore, his only risk in so doing was his loss on his interest charge, it would be a simple matter to reduce production commensurate with consumption, which would tend to standardize the whole foundation of the iron and steel industry. Greater stability in the price of pig iron means greater stability in the consumption and price of steel and all its commodities?

ORE BUYER.

Sound Evidence of Improvement

Considerable significance may be attached to the latest monthly report of unfilled tonnage upon the books of the United States Steel Corporation as of Jan. 31, 1911, issued last Friday. For the first time in more than a year or since the quarter ended Dec. 31, 1909, an increase over the preceding announcement of booked orders is shown. The gain in tonnage over the statement of Dec. 31, 1910, is shown to be 436,162. This is a change more marked both in percentage and actual tonnage than disclosed by any of the previous monthly statements.

Since the plan of making monthly announcements of unfilled business was inaugurated by the Corporation in July, a condition of steady decline of orders has been shown despite the fact that production has been repeatedly cut to accommodate the shrinking demand for shipments. These declines in tonnage and per cent and the dates at which the statements were taken from the books, are as follows:

	Tons.	Per cent.
Dec. 31	85,656	3.09
Nov. 30	111,536	3.88
Oct. 31	286,157	9.12
Sept. 30	379,022	10.74
Aug. 31	433,803	10.92
July 31	286,863	6.72

Contrasted to this unbroken list of losses is the sharp gain shown on January business, which is as follows:

Tons.	Per cent.
436,162	16.30

Prior to the making of monthly statements, the unfilled tonnage was made public at the close of each quarter. It has recently been officially stated by the Corporation that a comparison between all of these tonnage statements, monthly or quarterly, cannot properly be made because business passed between subsidiary companies was formerly included, as a consequence of which some of the tonnage did not express the orders placed for ultimate consumption. However, all the monthly statements at least, have been made under the same terms and conditions and these for comparative purposes are truly representative of the condition of the order books of the leading steel interest, with respect to general trading activity.

Increased orders upon the books, of course, may result from either of the two conditions of a larger volume of new business placed or a less active shipping movement. For a number of months up to early in January, the blast furnace and mill operations of the Corporation were steadily curtailed and reached the low mark of approximately 46 per cent at that time. During the past three or four months, a number of additional blast furnaces have been blown in by the Corporation and the steel requirements of the finishing mills have considerably increased. At the

close of the week just passed, it was announced that the leading interest was running close to 60 per cent of capacity, an improvement of practically 14 per cent since the first of the year. At the same time, there has been a further reduction of pig iron stocks, indicating that the raw material requirements of the mills have kept slightly ahead of the blast furnace output.

It would appear, therefore, that there is sound evidence, in the changed position of the Corporation, supporting a belief that a turn-about in the character of the steel market has been reached and that probably the low stage of the decline has been passed. The increase in orders booked attests to the existence of substantial grounds for the more cheerful sentiments and statements of business which have been prevalent the past several weeks.

There are those who have been made skeptical or extremely conservative by the prolonged depression in the steel trade so that they are slow to accept the view that a turn for the better has really come. In the large increase of orders booked by the Corporation, there is a concrete expression of the fact that the volume of January business, which is now being sustained, represents a substantial expansion of trade.

The real interest of the steel trade, however, lies in the permanency of the improvoement and it is to be hoped that the broadening of the demand for finished materials may prove to be long-continued until it shall have lifted pig iron and the other raw materials from the present slough of sacrifice prices, thus contributing to the betterment of the whole industry.

Vicious Labor Leaders

In the annual address of President William L. Gerstle, of the Chamber of Commerce, San Francisco, a very frank and courteous statement was made concerning labor conditions in that city, calling attention to the lamentable fact that since the fire in 1906, manufacturers in San Francisco have decreased year by year, until today the city has only 30 per cent of the number it had four years ago. This condition Mr. Gerstle attributes to the failure of San Francisco to enforce the open shop, which prevails in cities competing with the metropolis of California. He urged that unorganized labor has rights just as sacred as those of the unions, and declared that prices of labor ought to be regulated, like everything else, by the law of supply and demand. Mr. Gerstle added:

After our fire many people said that San Francisco could not be rebuilt, and it certainly did look like a hopeless task, but we have done so and have astonished the world. With such a spirit as was displayed in rebuilding San Francisco, we certainly should be able to inaugurate a reform in our present labor conditions. All it requires is united action and the battle is won. We must get together and stay together, in a spirit of loyalty to each other which would not permit anyone to take advantage of the misinformation of another. That that can take place is not the dream of an enthusiast blind to the difficulties of bringing about these ideal conditions, for I fully realize that it is not easy. However, it is possible, and sooner or later we must wake to the effort. Why not do it now? Otherwise, all the money and energy spent on rebuilding San Francisco is practically wasted. It would have been far better to have saved what we could out of the wreck and moved to some other community. Portland and Los Angeles have both enforced the open shop, and though, like the ostrich we may put our heads in the sand and thereby not see what is staring everybody else in the face, it is a fact that both of these cities, due to their courage in working under open shop principles, are growing day by day in manufacturing importance, while we sit idly by and allow them to take our trade away. It requires leadership to bring these results about, and I know of no better medium than the Chamber of Commerce of San Francisco.

There certainly was nothing intemperate or unreasonable about Mr. Gerstle's address, and yet what do we find as the attitude of organized labor? Several labor leaders replied in a most caustic, vindictive manner. The secretary of the San Francisco Labor Council talked about "wiping out" anyone who made a start to fight for the open shop. Even more savage was A. O. Tveitmoe, who said: "If the bankers try to fight us by tying up the money of union men, we will break them. If they withhold credit from union contractors and union supporters, we will fight them to the finish. We will have a line of union depositors that will break every bank in San Francisco."

We submit that if the advocates of the open shop and those favoring a closed shop can be judged by the language used in the recent discussion, there ought to be little doubt as to who will have the sympathy of the justice-loving people of the Pacific coast.

Mr. Farrell's Election.

Commenting on the election of James A. Farrell as president of the United States Steel Corporation, *The Iron and Coal Trades Review*, London, says editorially in its issue of Feb. 3:

Mr. Farrell's promotion from the presidency of the export subsidiary company of the Steel Corporation to the presidency of the Corporation itself is the clearest indication possible that the export policy of the Corporation as hitherto developed is not likely to experience any change. Mr. Farrell was, in the international steel market, a strong votary of the principles of intelligent co-operation and "friendly rivalry" which Judge Gary, chairman of the Steel Corporation, has preached so forcibly and effectually in regard to the domestic market conditions of the United States. Upon the resignation of William E. Corey as president of the Steel Corporation the first statement given out, under full official sanction, was that no successor would be appointed immediately, if at all, and this was naturally interpreted as indicating that the quasi double-headship to the Steel Corporation of a president and a chairman had been found not to work entirely well, and that there was doubt whether a new president could be found who could be depended upon to be in entire accord with Judge Gary. Mr. Farrell's selection immediately thereafter furnishes a clear indication that he is such a man.

Shipment of coke from the Colorado Fuel & Iron Co.'s ovens to smelters in Mexico has been curtailed because of cancellations growing out of revolutionary disturbances in Mexico. This would show that the disturbances are more extensive than supposed.

The works of the Berry Foundry & Mfg. Co., St. Joseph, Mo., which have been shut down for several weeks because of a labor contest, have again been placed in operation, a force of 50 independent molders having been secured.

The Valley Mold & Iron Co., Sharpsville, Pa., is accepting bids for a two-story office building.

INCREASED BOOKINGS

'By Corporation Mills Reflected in Tonnage Statement.

Positive evidence of the increased bookings of the mills during January is shown by the monthly statement of unfilled tonnage of the United States Steel Corporation as of Jan. 1, 1911, issued last Friday, which is relatively the most favorable showing of business entered in the period of more than a year. The statement showed a net increase of 436,162 tons over the tonnage upon the books at the close of business Dec. 31, 1910. The total amount of orders on hand Jan. 31 was reported as 3,110,919 tons, compared with 2,674,757 tons as of Dec. 31. This gain has been accomplished in the face of increased mill operations and has exceeded the most cheerful expectations, since the increase was not thought at the most to exceed 300,000 tons and in many quarters it was believed it would be about 200,000 tons.

The unfilled tonnage Jan. 31 is the first to record a net gain over the preceding month since the method of issuing monthly statements of unfilled orders was inaugurated by the Corporation in July of the past year. It is the first statement to show any increase in the Corporation's bookings over preceding announcements since at the close of the last quarter of 1909, from which time to the present month the tonnage announcements have shown a steady decline. Since the plan of making monthly statements of unfilled tonnage has been followed by the Corporation, the statements of business on hand, the tonnage and percentage of increase or decline from the previous month, have been as follows:

Date.	Total.	Change Tonnage.	Per cent.
Jan. 31, 1911.....	3,110,919	436.162	16.3
Dec. 31, 1910....	2,674,757	85,656	3.09
Nov. 30, 1910.....	2,760,413	111,536	3 88
Oct. 31, 1910.....	2,871,949	286,157	9.12
Sept. 30, 1910....	3 158,106	379,022	10.74
Aug. 31, 1910.....	3,537,128	433,803	10.92
July 31, 1910.....	3,970,931	286,863	6.72
June 30, 1910.....	4,257,794	.....	.....

The relative statement of the Corporation's unfilled tonnage at the end of each quarter since the beginning of the recent decline that now appears to have been arrested, are as follows:

June 30, 1910	4,257,794
March 31, 1910	5,403,514
Dec. 31, 1909.....	5,927,031
Sept. 30, 1909.....	4,796,833

The most successful banquet in the history of the Chicago Foundry Foremen's Association was held at the Sherman hotel, Saturday night, about 200 persons being present. President J. G. Garrard presided as toastmaster. Addresses were delivered by Herman O. Lang, George Woodruff and former Senator Wm. G. Mason. Mr. Woodruff, who has traveled extensively, spoke interestingly on opportunities for American steel manufacturers and machinery builders in South America and China.

Testing Port Henry Tract for Ore Body

Diamond drill work is being done by the Buffalo Union Furnace Co. upon a tract of land immediately adjoining the property of the Cheever Iron Ore Co., at Port Henry, N. Y., in an effort to develop a workable ore body to contribute to the requirements of its Buffalo furnaces. The property being tested is known as the Goff tract and embraces quite a large acreage. The mine of the Cheever Iron Ore Co. was first opened many years ago and, after being operated for many years, was abandoned for 20 years until re-opened in 1906. In 1909 it was acquired by the Bethlehem Steel Co. and Witherbee, Sherman & Co., Inc., and has been furnishing ore to the Bethlehem furnaces at South Bethlehem, Pa. The mine has a capacity of producing about 400 tons of high grade magnetites daily.

St. Louis Shipments

Receipts and shipments of pig lead and spelter at St. Louis for the last two weeks were as follows:

	Zinc and spelter.	Pigs of lead.
Receipts:—		
For week ending Feb. 4.....	98,500	32,290
For week ending Feb. 11.....	93,870	50,150
Shipments:—		
For week ending Feb. 4.....108,220		24,590
For week ending Feb. 11.....103,350		24,320

Employers' Association.

The Employers' Association of Cleveland has selected as permanent secretary Attorney E. J. Hobday. Well appointed offices have been opened in a very convenient because central location, 607-8 Superior Arcade.

Branch Meeting

The annual meeting of the Cleveland branch, National Metal Trades Association, will be held March 2, at the Hollenden hotel, Cleveland. Interesting reports will be presented.

The General Electric Co. has declared the regular quarterly dividend of 2 per cent, payable April 15.

STOCKS INCREASED

According to January Report of Copper Producers' Association.

The Copper Producers' Association reported Feb. 8 that stocks of copper on hand, Jan. 31, were 142,439,490 pounds, an increase of 20,409,295 pounds over stocks on Dec. 31. Production in January decreased 7,642,628 pounds, as compared with December. The monthly report in detail, showing comparisons with December, 1910, and January, 1910, follows, the figures being in pounds:

	Jan., 1911.	Dec., 1910.	Jan., 1910.
Stocks previous month	122,030,195	130,389,069	141,766,111
Production..	115,696,591	123,339,219	116,547,287
Total	237,726,786	253,728,288	258,313,398
Domestic del.	42,078,557	43,594,018	78,158,387
Exports	53,208,739	88,104,075	81,691,672
Total consn.	95,287,296	131,698,093	159,850,059
St'ks rem'g...	142,439,490	122,030,195	98,463,339

Welsh Tin Plate Trade

Swansea harbor trust returns for the week ending Jan. 21, with comparisons, follow:

	Week of Jan. 21. Boxes.	Previous week. Boxes.	Corresponding week last year. Boxes.
Received	85,373	104,780	67,143
Shipped	91,570	66,179	56,407
Stocks	188,999	203,196	133,301

New York Copper Exports

Copper exports for the week ending Feb. 9 were 4,547 tons, a decrease of 4,864 tons; from Feb. 1 to Feb. 9, 8,155 tons, a decrease of 6,558 tons; from Jan. 1 to Feb. 9, 37,442 tons, a decrease of 4,000 tons.

Articles of incorporation of the Tacoma Foundry & Machine Co. have been filed with the auditor of Pierce county, Wash., with a capital stock of $15,000. The trustees are named as Wilson Webb, Thomas B. Hall, Fred J. Townsend and Reginald T. Pamment, all of Tacoma. The new plant is to be in operation before the end of the summer.

The accounting department of Hickman, Williams & Co. will be concentrated hereafter at the Cincinnati office, First National Bank building, in charge of Mr. Eaton, resident manager. The company is looking for larger quarters and a new location to accommodate its enlarged office force.

The Holbrook-Armstrong Iron Co., of Racine, Wis., by a charter amendment, has increased its capitalization from $150,000 to $300,000.

DECISION EXPECTED

Shortly in Quebec Bridge Difference As to Plans.

Toronto, Can., Feb. 14.

Hon. George P. Graham, minister of railways, has stated in Parliament that the competition for the Quebec bridge contract now remains between the British Empire Bridge Co., an English concern, and the St. Lawrence Bridge Co., an amalgamation of the Walkerville, Ont., and the Lachine Bridge Co. The contest has been narrowed down to the tender submitted by the British Empire company based on the plans prepared by the commission, and to three alternative proposels of the St. Lawrence company based on its own designs. The tender of the British company was the lowest of all of those submitted and was favored by Chairman Vautelet of the commission. The two other members, however, preferred one of the St. Lawrence company's designs. The other experts called in to finally decide the matter, M. J. Butler, formerly deputy minister of railways, and H. W. Hodge, of New York, are now reviewing the plans and a decision is expected shortly. All the designs provided for a bridge 80 feet wide and 150 feet above high water.

The January output of the Nova Scotia Steel & Coal Co. shows a considerable increase in the production of pig iron and finished products, and a decrease in steel ingots and coal as compared with January, 1910. The figures in tons were as follows: Coal, 43,066; pig iron, 7,400; ingots, 6,300; finishing, 4,577.

More Koppers Contracts

The American office of H. Koppers, Joliet, Ill., has just received a letter from the office in Germany, stating that two new contracts have just been signed, as follows: Two hundred and eighteen ovens, with by-product apparatus for 302 ovens, for Hoesch Steel Works, Dortmund, Germany; and 100 ovens with by-product plant for De Wendel, Hamm, Westphalia, Germany. The former of these is in a plant where heretofore Otto ovens were installed. The second is a second repeat order for the De Wendel plant.

Foreign Ore Market

Commenting on the British and Spanish ore markets, the Barrow-in-Furness correspondent of the *Iron and Coal Trades Review* says:

For iron ore there is an increasing demand, not only on local account, but from general sources, and particularly from Scotland. The amount of ore sent to Scotland from Hodbarrow, the Cleator district, and Barrow, has been very large for some time, and to some extent has cut down the available ore for local smelters. At the same time the supplies of foreign ore have not been very large for some time past. Prices are firm, with good average qualities of native ore at 12s 6d to 16s 6d, and the best sorts are up as high as 22s per ton net at mines. The demand for foreign ore is steady. Not a single cargo, however, arrived in Barrow Docks last week. Spanish ore is quoted up to 22s per ton, delivered to west coast furnaces, for best qualities.

St. Louis Car Co. is Reorganized

Reorganized by Milwaukee and St. Louis capital, its liabilities taken care of and with a large volume of unfilled orders on its books, the St. Louis Car Co., of St. Louis, is again operating under the direction of John I. Beggs, president and general manager of the Milwaukee Electric Railway & Light, Milwaukee Light, Heat & Traction and Wisconsin Traction, Power & Light companies of Milwaukee. Mr. Beggs is president and general manager of the St. Louis Car Co. Edward Meissner, chief clerk of the Milwaukee companies, has been elected a director and assistant to the president, and will have charge of operations at St. Louis as personal representative of Mr. Beggs. The St. Louis Car Co. has a fresh working capital of $400,000 under the reorganization and the automobile department, closed for some time, will be re-opened, its $40,000 mortgage being taken care of. Mr. Beggs plans to devote the major part of the automobile plant to the manufacture of commercial motor vehicles, trucks, delivery wagons, etc.

The Wheeling Corrugating Co., Wheeling, W. Va., manufacturer of black and galvanized steel sheets, has issued tables of standard sizes, showing weights of square feet of sheets and bundles (without bands) and the number of sheets in one bundle of various gages from Nos. 10 to 30 inclusive, of both black and galvanized sheets.

Scranton & Co., New Haven, Conn., announce that the line of upright power hammers which they have manufactured in the past, will hereafter be built and sold by E. R. Caldwell & Co., Bradford, Pa. A circular has been issued by E. R. Caldwell & Co., which briefly describes this line of hammers.

AGNEW LAUNCHED

Named in Honor of Manager of the Mahoning Mine.

The bulk freighter William C. Agnew, building for the Buffalo Steamship Co., was launched from the Lorain yard of the American Ship Building Co. on Saturday, Feb. 11, and was christened by Miss Elizabeth Kennedy, daughter of Hugh Kennedy, general manager of the Rogers-Brown Iron Co. The Buffalo Steamship Co. is the successor to the Buffalo & Susquehanna Steamship Co., which was dissolved when the Rogers-Brown Iron Co. took over the Buffalo & Susquehanna Iron Co. The Agnew is named in honor of W. C. Agnew, who is the general manager of the great Mahoning mine, at Hibbing, and is also consulting engineer for the Susquehanna mine at Hibbing, owned by the Rogers-Brown Iron Co. The new steamer will be managed by Capt. John Mitchell, of Cleveland.

The Agnew is 552 feet over all, 532 feet keel, 58 feet beam and 31 feet deep. She is an unusually staunch vessel, her hopper sides being carried to the spar deck both longitudinally and athwartships. Her water ballast space, however, will not extend to the spar deck, but will be obstructed by a shelf at the main deck carried from the skin of the ship to the hopper sides.

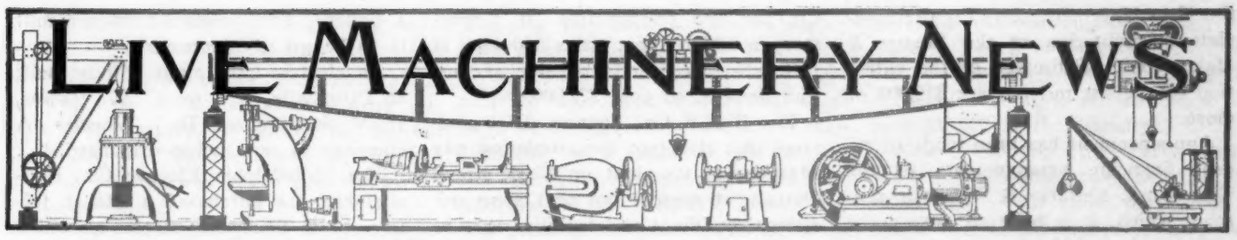
Following latter day practice, her accommodation for the guests of the management will be quite complete.

The launching party was carried in special cars from Cleveland to Lorain and at the conclusion of the launching returned to the Union Club for luncheon, as guests of the American Ship Building Co. Capt. Robert E. Bartlett, who commanded the Arctic ship Roosevelt, was one of the interested spectators at the launching.

At the annual meeting of the Falls Mfg. Co., of Gillett, Wis., the following were elected officers: President, A. C. Merryman; vice president, G. O. Bergstrom; treasurer, E. A. Edmonds; secretary and manager, J. H. Delbridge.

Niles-Bement-Pond Co. has declared a regular quarterly dividend of 1½ per cent on preferred stock, payable March 15, and of 1½ per cent on common, payable March 20.

Quincy Mining Co. has declared a quarterly dividend of $1 a share, payable March 20.



Machinery market conditions last week showed some improvement, and an optimistic feeling prevails in the trade to a greater degree than in a number of months. In New York, dealers anticipate heavier buying on the part of the railroads. It is expected that the list recently issued by the New York, Ontario & Western railway will be placed in the immediate future, while the Delaware & Hudson Co. is reported to be preparing a large list of machine tools. A number of smaller lists have also been submitted recently by interests other than the railroads. In Boston, a $50,000 list of machine tools has been issued by the New York, New Haven & Hartford company. In Pittsburg, a larger volume of business is being booked and bids have been invited on a large quantity of new work. A number of machinery manufacturers have recently increased the number of their operatives. In the middle west, the number of small sales has increased but no important business has developed. In San Francisco, much improvement has been noted and several large orders which have been held in abeyance for some time have finally been placed. In this section, mining and power machinery is most active. In the south, public improvements to be proceeded with immediately form the chief feature of interest.

Railroads

It is reported that the Chattanooga Southern Railway Co. is planning the construction of shops at Alton Park, Tenn. Address C. H. Fisk, chief engineer, Chattanooga.

Patterson, Moran & Buck, Pittsburg, railroad contractors, are buying machinery, tools, etc., to be used in the construction of the State Line & Southern railroad in West Virginia. About $700,000 will be expended for grading and masonry work and the new line will represent an expenditure of approximately $1,300,000.

Iron and Steel Works

Plans are being prepared for enlarging the plant of the Des Moines Bridge & Iron Co.'s plant at Neville Island, on the Ohio river, near Pittsburg.

The Jones Iron Co., J. T. Jones, president, Iron Mountain, Mich., expects to locate a steel plant in Marquette County, Mich., in the near future. Definite plans, however, have not been decided upon. The Jones Step Process furnace will be used to smelt the ore.

The Inland Steel Co., Chicago, expects to erect a new blast furnace, 400 tons daily capacity, at its plant at Indiana Harbor in order to increase its supply of pig iron and also to take advantage of the economies derived from charging hot metal direct into the open hearths.

Bids will be received next month by the Gary Screw & Bolt Co., at the general offices in Pittsburg, for new buildings and necessary equipment for the new plant to be built at Gary, Ind., plans for which were outlined a few weeks ago. The plant will cost about $1,000,000 and will have a capacity of upward of 50,000 tons of nuts, bolts, rivets, etc., a year.

Foundries

The United Engineering Works, Alameda, Cal., has taken out a permit for a new foundry.

Charles J. Stanzel, Brownwood, Tex., is planning the erection of a building to be used as a foundry, machine shop and boiler shop.

Filer & Stowell, Milwaukee, Wis., are considering plans for a small new brass foundry, to take the place of the one recently destroyed by fire.

The Sherman Machine & Iron Co., Oklahoma City, Okla., is reported to be preparing plans for a foundry, machine shop and other shops. The estimated cost is $400,000.

The Knox City Iron Works, Knoxville, Tenn., has purchased the plants of the Clinton Iron Works and the Maryland Iron Works, and will manufacture stoves and other foundry products.

Bids have not yet been invited on equipment to be installed at the two new foundry plants to be erected at Trafford City, Pa., by the Westinghouse Electric & Mfg. Co., Pittsburg. The American Bridge Co. has the contract for the two new buildings and preliminary work has already been started. The Westinghouse company is making a number of minor improvements at the East Pittsburg, Pa., works.

Public Works

Lonsdale, Tenn., has asked the legislature of that state to authorize a bond issue of $25,000 to pay for a new water works system.

The city council, Bedford, Ind., has decided to install an electric pumping system at the city water works. W. L. Hurd, Indianapolis, is consulting engineer.

Helena, Mont., will receive bids about April 20 for the construction of water works. The estimated cost is about $600,000. J. A. Mattson is city clerk.

The water commission of Memphis, Tenn., has recommended the issue of $1,000,000 of new bonds, part of which will be used for increasing the pumping facilities of the company. Much new pipe will also be purchased. A new system of feed water heaters is to be installed in connection with the boilers of the water works.

Machine Tools

The Simms Magneto Co., 1780 Broadway, New York City, is buying a few tools for its new plant at Watsessing, N. J. This company recently closed for some equipment for its tool room but has done little as yet towards its manufacturing needs and a large list is now in the course of preparation.

The New York, New Haven & Hartford Railroad Co. has entered the Boston market with a large list of machine tools, which is expected to be closed for in the near future. The prospective purchases are in line with the policy now being carried out by

the New Haven interests for the complete rehabilitation of the Boston & Maine road. Estimates of the valuation of the list put out are $50,000 or more.

Announcement has been made of recent financing arrangements of the New York, Ontario & Western railroad, which, it is believed, insure the early placing of the large tool list put out by this road last week for its Middletown, N. Y., shops. While no official awards of this list have as yet been made, it is understood that it is practically settled that the distribution will be made among comparatively a few interests.

The Delaware & Hudson Co. took bids last week for the construction of its extensive new railroad shops at Watervliet, N. Y. A large tentative list of tool requirements for these shops is now nearing completion and is expected to appear in the eastern market before many weeks. The company has recently been purchasing some special machines for different shops but these have had no connection with the Watervliet improvements.

New Works

The California Pipe & Steel Co. has commenced the construction of a new factory building at Taft, Cal.

The Woonsocket, R. I., Machine & Press Co. has awarded contract for the erection of a large addition to its plant.

The Royal Enameling & Stamping Works, Des Plaines, Ill., is negotiating for a site for a branch factory in Oakland, Cal.

The Yuba Construction Co. has purchased the plant of the Eastern Engineering Co. at Marysville, Cal., and will greatly enlarge the works.

A company is being organized at Humboldt, Tenn., for the manufacture of a patented floating water motor. I. H. Dungan is promoting the company.

The Banner Electric Co. has purchased 150 x 150 feet of land adjoining its present plant at Youngstown, O., and is preparing plans for additions to its present works.

H. F. Beauchamp, 442 Virgil avenue, Los Angeles, Cal., has been awarded the contract for erecting a two-story machine shop, 40 x 100 feet, for J. L. Reynolds, that city.

The Orinda Stove & Mfg. Co., Quincy, Ill., has been incorporated by C. H. Wurst, Henry Lange and A. H. Storke for $30,000. The company expects to do a general stove, range and sheet metal business.

The S. S. Wenzell Co., Philadelphia, has awarded contract to P. Hailbach Co. for the construction of a one-story machine shop, 100 x 150 feet, at Fifteenth street and Parkside avenue, Philadelphia, to cost $27,000.

The E-M-F Co., Detroit, Mich., advises that it is not contemplating any additions to its plant on Clark street, Detroit, at present but that some additional buildings and facilities may be installed later in the spring.

Plans have been completed by the Potter Automatic Change Computing Co., Portland, Ore., for the new plant to be built at Trafford City, Pa. Bids on the new buildings and equipment are expected to be asked for next month.

The Lexington, Ky., Machine Works, which recently incorporated, will manufacture gas engines and do a general machinery business. It is asking for prices on boilers, electrical machinery, engines and metal-working equipment.

Charles L. Barker, Norwalk, O., manufacturer of gasoline engines, will shortly build an addition to his plant for the manufacture of motor trucks.

The Atlantic Screw Works, Hartford, Ct., is building an addition to its plant. It is reported that the capacity of the plant is to be doubled.

The Anderson Resilient Wheel Mfg. Co. has been incorporated at Nashville, Tenn., for the manufacture of automobile wheels. Pneumatic tires will be discarded, and resilient spring spokes are expected to answer the purpose. The company has a capital stock of $500,000, and announces that a plant will be erected shortly. Offices have been secured in the Stahlman building at Nashville.

Power Plant Equipment

New Castle, Pa., is planning the erection of a municipal electric light plant.

Webster City, Ia., has purchased a site for a new municipal light and power plant.

The Crowell-Sherman-Stalter Co. will construct an electric power plant at Lyons, N. Y.

An auxiliary plant is to be constructed by the Russellville Water & Light Co., Russellville, Ark.

J. W. Albright is reported to be interested in the construction of a 50,000-horsepower power plant at Burlington, Ia.

Arlington, O., is reported to be in the market for a boiler for its municipal lighting plant. R. E. Dillon is superintendent.

The Haskew Lumber Co., South Pittsburg, Tenn., is in the market for a boiler. The power of its saw-mill is to be greatly increased.

An electric light plant will be built at Paintsville, Ky., by C. W. Howes, H. M. Stafford and D. J. Wheeler. A company is now being organized.

The Philadelphia Electric Co., Philadelphia, has purchased a site at Jefferson and Thirteenth streets on which an auxiliary power plant will be erected.

The Wilkes-Barre Light Co., Wilkes-Barre, Pa., has filed plans for a new plant to be built on Washington street. E. A. Wakeman is manager of the company.

The installation of new boiler equipment during the coming summer is under consideration by the Red Oak Electric Co., Red Oak, Ia., S. F. Shadel, manager.

The Pittsburg Railways Co. will rebuild the boiler house and store room at the south end of the Mt. Washington tunnel, Pittsburg, destroyed by fire recently.

The officials of the great Western Power Co. are preparing to add another unit to their power plant at Great Bend, Cal. The cost will be about $200,000.

The Jacksonville, Fla., Electric Co., under the control of Stone & Webster Engineering Corporation, Boston, Mass., is planning the construction of a $450,000 power plant.

Bids are being received by F. D. B. Ingalls, Rosenbloom building, Syracurse, N. Y., for a 55 x 30-foot power house to be constructed by the county of Otsego at Phoenix Mills, N. Y.

The Smith Cooperage Co., Louisville, Ky., which, as recently reported, is to establish an electric light plant at Livermore, Ky., is now in the market for equipment for the plant.

Wamego, Kas., is considering the installation of a 200-kilowatt, single-phase generator, direct-connected to a Corliss engine in the municipal light plant. D. A. Course is superintendent.

A committee appointed by the mayor of Olean, N. Y., has reported in favor of the city building a municipal electric plant capable of running 200 arc lights and 300 incandescent lights.

Preparations are being made to rebuild the municipal lighting plant at Wynne, Ark., at once. The system is to be changed from direct to alternating current. W. H. Allen is superintendent.

The Northern Ohio Traction Co. has awarded contract for the equipment for its new plant at Cuyahoga Falls, O., to the General Electric Co. A 1,000-kilowatt generator, a 115-

horsepower motor and eight four-motor car equipments are included.

The Union Cutlery Co., Tidiute, Pa., will soon start construction work on a new factory at Olean, N. Y., to which city the plant will be moved. The construction plans provide for a power plant.

The Canadian General Electric Co., Toronto, has obtained the contract for the plant for the new power station to be erected in Winnipeg, Man. It will be installed in four units of 3,000 kilowatts each.

The citizens of Sherbrooke, Que., have approved a by-law authorizing a loan of $100,000 for the construction of a dam and the development of electric power on the Magog river, near Rockforest.

The Elmira Water, Light & Railway Co., Elmira N. Y., has been authorized by the public service commission to issue $243,995 worth of bonds for extensions to its lines and improvements to its plant.

The City of Calexico, Cal., will in all probability be in the market for machinery for an electric lighting plant which it is proposed to establish and operate in connection with the present water plant.

Plans are being considered by the water and light department, St. Peter, Minn., for improving and extending the municipal electric light system, including the installation of two additional motors at Kasota.

The plant of the Gibson Electric Light & Power Co., Gibson, Ill., has passed into the control of new owners and will be improved and enlarged under the direction of F. J. Postle, consulting engineer, Chicago.

Bids will be received until March 1 by David Ewing, chief engineer of the power house, Strathcona, Alta., for engines, boilers and generators to be installed in the plant. A. J. McLean, city engineer, will furnish specifications.

The Nicholson Coal Co., of which J. C. Cardwell, Louisville, Ky., is president, is planning the installation of an electric light and power plant at Middlesboro, Ky. The power will be used for operating conveying machinery.

The city of Hamilton, Ont., is considering the advisability of building a municipal power plant and the board of controllers has passed a resolution instructing the city clerk to advertise, asking electrical engineers and concerns to submit tenders for the job of making a complete report. The applications must be in by March 1. The city may build a plant to supply both power and light.

Application for a charter has been made by the Maine Power Co., which is to be capitalized at not more than $1,500,000, with authority to acquire the rights, of incompleted plant and franchise of the Bodwell Power Co. The plant is located thirteen miles up the Penobscot river from Bangor, Me., and engineers have estimated that by an expenditure of $500,000 or less the venture can be made a financial success.

The Pacific Gas & Electric Co. is planning to invest the sum of $1,000,000 in improvements to its plant at Sacramento, Cal., during the year 1911. It is proposed to erect a plant for the purpose of generating electricity by steam instead of by the transmission system now in use. The cost is estimated at $500,000 exclusive of the site, which has already been purchased. Plans are being made for a steam turbine with an average capacity of 15,000 horsepower. Extensions will also be made on the gas mains and street railway owned by the company.

Miscellaneous

A. Bentley & Co., Toledo, O., have secured the contract to erect the Beaver Power building, First and Foundry streets, Toledo.

The Holton Power Co. has let the contract to Allis-Chalmers Co. for the construction of a gas producer plant at El Centro, Cal., to cost $250,000.

Bids are being received by the Carnegie Technical Schools, Pittsburg, for equipment to be used in the extension of the buildings, power house, etc., authorized recently, to cost about $150,000.

Announcement is made by the Southern Motor Works, Nashville, Tenn., that it will enlarge the capacity of its plant and manufacture commercial cars as well as passenger automobiles.

Machinery is now being installed in the New Albany, Ind., plant of the American Automobile Mfg. Co., under the direction of Superintendent C. D. Norris. It will be several months before the plant is put in operation.

The board of harbor commissioners of the State of California has awarded the contract for a six-wheeled switching locomotive to be used on the Belt Line railway in San Francisco, to the Vulcan Iron Works, Wilkesbarre, Pa., at $11,525.

The Joshua Hendy Iron Works, Sunnyvale, Cal., which is filling a large order of special pipe joints and gates for the construction work of the Panama canal, has received an order for a 40-stamp mill to be set up for a Nevada mining firm. The plant will cost $50,000 at the foundry.

Albert Garren, 1139 Ferry street, Easton, Pa., wants prices on a second-hand, 200 x 400 cubic feet capacity, steam driven air compressor; a second-hand, 8 x 10 or larger, double-cylinder, single or double drum hoist, friction or reversible link motion; and two second-hand high pressure pumps, 6-inch suction and 5-inch discharge.

Government News

Bids opened at the bureau of supplies and accounts, navy department, Washington, Feb. 6, were as follows:

BOLTS AND NUTS.—4,200 pounds steel bolts and nuts—Baker & Hamilton, San Francisco, $530; R. W. Geldhart, New York, $39.60; J. B. Kendall Co., Washington, $292.70; R. B. Sherman, New York, $387.75.

BRASS NUTS.—740 pounds brass nuts: Berry & Aiken, Philadelphia, $258.50; Manhattan Supply Co., New York, $268.75; Nadham Co., New York, $260.60; R. B. Sherman, New York, $302.45.

VALVES.—Composition globe valves, as follows: 450 ¼-inch, 450 ½-inch, 13 3-inch angle valves, and 6 ¾-inch cross valves: Cuyler & Moeller, Baltimore, $681.15; R. W. Geldhart, New York, $586.95; Lunkenheimer Co., Cincinnati, $777.50; Manhattan Supply Co., New York, $999.70; Montgomery & Co., New York, $587.78; Manning, Maxwell & Moore, New York, $752.30; William Parker & Co., Cincinnati, $676.48; Pacific Hardware & Steel Co., San Francisco, $898.15.

STEEL WIRE. — 11,500 pounds crucible cast steel wire, 3,000 pounds 0.045 diameter and 8,500 pounds 0.037 diameter: R. B. Sherman, New York, $921.25; Waterbury Co., New York, $903.20.

BRASS WIRE.—700 pounds spring brass wire: Berry & Aiken, Philadelphia, $129.44; Benedict & Burnham, New York, $141; Jas. Clendennin, Baltimore, $143.10; A. P. Swoyer, Philadelphia, $209.

SHEATHING.—4,100 pounds yellow metal sheathing: U. T. Hungerford Brass & Copper Co., New York, $145; Taunton-New Bedford Copper Co., New Bedford, Mass., $133.

SHEATHING. — 4,100 pounds hard-rolled copper sheathing: Ansonia Brass & Copper Co., New York, $1,592; Berry & Aiken, Philadelphia, $1,784; Jas. Clendennin Co., Baltimore, $1,623; U. T. Hungerford Brass & Copper Co., New York, $1,750; C. G. Hussey & Co., Pittsburg, $1,650; Rome Brass & Copper Co., Rome, N. Y., $1,572; Taunton-New Bedford Copper Co., New Bedford, Mass., $1,548.

RIVET STEEL.—8,500 pounds medium bar steel and 3,000 pounds medium rivet steel in 12 to 16-foot lengths: Bethlehem Steel Co., South Bethlehem, $361.88; Carnegie Steel Co., Philadelphia, $264.50; Crucible Steel Co., Pittsburg, $295.40; J. B. Kendall Co., Washington, $261.88.

STEEL SHAPES.—208,450 pounds medium steel shapes in 30-foot lengths as specified, black angles, I-beams and channels: Carnegie Steel Co., Philadelphia, $0.0172 per pound; J. B. Kendall Co., Washington, $0.016979.

SHEET STEEL.—100,000 pounds galvanized sheet steel, 36-inch by 96-inch, No. 20 U. S. standard gage: Jas. Clendennin, Baltimore, $0.0289 per pound; De Forest Sheet & Tin Plate Co., Niles, O., $0.028; R. C. Hoffman Co., Baltimore, $0.0282; J. B. Kendall Co., Washington, $0.0283; Manhattan Supply Co., New York, $0.02809; Merchant & Evans, Philadelphia, $0.0282; Murer Bros., Brooklyn, $0.0275; Vermilye & Power, Philadelphia, $0.028968; Youngstown Sheet & Tube Co., Youngstown, $0.028; American Rolling Mill Co., Middletown, O., $0.04.

BRONZE TUBING.—6,000 pounds seamless drawn bronze tubing: Benedict & Burnham, New York, $1,279.36; National Brass & Copper Tube Co., New York, $1,350.49; Rome Brass & Copper Co., Rome, N. Y., $1,452.

STEEL TUBING.—1,846 feet cold-drawn,

seamless steel tubing: Cuyler & Moeller, Baltimore, $832.70; National Tube Co., Pittsburg, $872.28.

Bids are invited by the bureau of supplies and accounts, navy department, Washington, as follows:

Until Feb. 28: 5,500 pounds steel forgings for delivery at Washington navy yard, schedule 3344; 4,600 pounds asbestos millboard, Brooklyn, schedule 3349; 28,500 pounds shields, Washington, schedule 3344; 13,475 pounds condenser tubes, Brooklyn, schedule 3349; miscellaneous junction boxes, Norfolk, schedule 3348; five dozen twist drills, Washington, schedule 3343; miscellaneous drills, Washington, schedule 3343; 12 machinists' hammers, Washington, schedule 3343; miscellaneous hardware and tools, Philadelphia, schedule 3346; 25 pairs side-cutting pliers, Washington, schedule 3343; 21 dozen hand reamers, Washington, schedule 3343; 26,000 pounds crucible cast steel wire, Boston, schedule 3346; 101 dozen cast iron elbows, Brooklyn, schedule 3349; miscellaneous brass pipe fittings, Brooklyn, schedule 3349; 85 dozen cast iron unions, Brooklyn, schedule 3349.

Until March 7: Two oil barges, construction of, delivery at Norfolk, schedule 3340; 40,000 pounds ingot copper, Bremerton, Wash. schedule 3338; 85,000 pounds ingot copper, Mare Island, Cal., schedule 3338; one windlass, steam brake, Charleston, S. C., schedule 3354.

Until March 14: Miscellaneous brass and copper sheet, Norfolk, schedule 3353; 750 bushels charcoal, Mare Island, Cal., schedule 3352; 40,000 pounds steel floor plates, Bremerton, Wash., schedule 3353.

The following awards have been made by the navy department on bids for armor plate opened in Washington, Dec. 1: Midvale Steel Co., Philadelphia, 2,061 tons class A at $420 per ton, 121 tons class A turret armor at $480 per ton, 60 tons class C at $460 per ton, 19 tons class D at $655 per ton and 13 tons class E at $508 per ton; Bethlehem Steel Co., South Bethlehem, 1,997 tons class A at $420 per ton, 121 tons class A turret armor at $480 per ton, 38 tons class C at $460 per ton, 79 tons class B at $655 per ton and 22 tons class E at $508 per ton; Carnegie Steel Co., Philadelphia, 1,716 tons class A at $420 per ton, 364 tons class A turret armor at $480 per ton, 112 tons class C at $640 per ton and 15 tons class E at $508 per ton.

The Isthmian Canal Commission has made awards as follows on bids opened in Washington, Jan. 31: Standard Chain Co., Pittsburg, 1,250 feet short-link chain, $1,284; Cleveland Crane & Engineering Co., Wickliffe, O., 87 gross brass screws, $44.87; United States Steel Products Co., New York, 1,500 pounds wire finishing nails, $41.25.

Circular 622, about to be issued by the Isthmian Canal Commission, Washington, will invite bids for manganese steel castings, wire rope, gear and milling cutters, auger bits, foundry core machine and electric fans.

The contract for constructing a general foundry at the Bremerton navy yard, Puget sound, has been awarded to M. W. Concannon, San Francisco, at item 2, $143,825.

The contract for constructing a steel bridge in the District of Columbia has been awarded to the Penn Bridge Co., Beaver Falls, Pa., for $19,750.

Wire Concerns Consolidated

The American Wire Fabrics Co. has been incorporated in Iowa with $1,500,000 capital stock for the purpose of consolidating these four wire cloth concerns: The American Wire Cloth Co., of Clinton, Ia.; the National Wire Cloth Co., of Niles, Mich.; the New Freedom Wire Cloth Co., of New Freedom, Pa.; and the Pennsylvania Wire Cloth Co., of Mt. Wolfe, Pa. It is proposed to have branch offices in various cities of the United States.

DOMESTIC ORES.

Selling in East at Fair Prices—Tonnage is Limited.

Eastern blast furnace interests have been closing some contracts for domestic iron ores for early shipment with New Jersey and New York state miners, and have engaged recently 25,000 tons or more of these grades at prices ranging from 7½ to 8 cents per unit of iron delivered to the consumer's plant. For the better eastern domestic ores about 8 cents per unit, delivered, is being obtained. Such transactions are not of great significance in the eastern ore market, owing to the limited capacity of the scattered mining operations in New Jersey and New York, which participate in this business. The Port Henry and the largest domestic operators of the east have done nothing as yet with the determination of prices for the present season. Sales of foreign ores continue to be confined chiefly to the Wabana, Newfoundland, deposits, of which contracts recently made call for 150,000 tons, closed as reported, at 7⅜ cents cents per unit of iron, ex-ship Philadelphia.

New Pier to Handle Foreign Ore Cargoes

The rapid discharge of iron ore cargoes from foreign workings at the port of Philadelphia will be considerably facilitated by a large new unloading pier, known as pier 14, which is just being completed by the Philadelphia & Reading railroad. The new pier is most modernly equipped with electric cranes and conveying machinery extending over four tracks and has a capacity for discharging 10,000 tons of ore daily direct from the ships into cars. The new pier is 125 feet wide and 764 feet long, and has four railroad tracks running the entire length. It is the longest pier along the Delaware and Schuylkill rivers' water front. The construction work on the pier was inaugurated in February, 1909, and about $500,000 was spent in completing the structure.

Ore Region Map

For the past few years, the ore analyses books issued by the iron mining companies in this country have shown great improvement in typographical appearance and in completeness of the information furnished. Oglebay, Norton & Co., Cleveland, this year have taken a new step in advance by sending out with their analyses book a map of the Lake Superior ore region, showing the location of the different districts, including Michipicoten, and Moose Mountain range. The map is 27 x 16 inches, and the company has a few extra copies, not folded, printed on heavier paper, and, therefore, in better shape for framing, which will be sent to anyone connected with the iron and steel business who makes application.

Southern Pipe Contracts

Nashville, Tenn., Feb. 13.

A contract for cast iron pipe has been closed by the United States Cast Iron Pipe & Foundry Co. with W. C. Swanwick, of Joplin, Mo., who will lay the new pipe line at Johnson City, Tenn. The contract calls for 2,000 feet of 12-inch pipe, 28,000 feet of 14-inch pipe; and 16,000 feet of 18-inch pipe. Swanwick's contract with the city calls for an expenditure of $185,000.

The Tennessee Oil & Gas Co. will purchase pipe for a line to be run from its well to Algood, Tenn.

Bids will be received by the Memphis, Tenn., artesian water department, shortly, for furnishing 1,800 tons of cast iron pipe ranging from 6 to 16 inches in diameter. Lawrence Simpson is general superintendent.

Manufacturers Meet.—The annual banquet of the Manufacturers' Association of Pittsburg was held at the Union Club, Pittsburg, Feb. 10. Hon. Joseph A. Langfitt, Pittsburg, presided as toastmaster. Addresses were delivered by W. H. Hamilton, of the Rosedale Foundry & Machine Co., Pittsburg, president of the association; J. H. Schwacke, president of the National Metal Trades Association, Philadelphia; Congressman A. J. Barchfield; Dean C. B. Connelley, of the Carnegie Technical Schools, Pittsburg; W. M. McCulloch, of the Marshall Foundry Co., vice president of the association.

The Fechheimer Steel & Iron Co., Allentown, Pa., has been incorporated, capitalized at $25,000, with Philip Gaspard, of Allentown, as treasurer. The company recently acquired a large tract, favorably located in Allentown, upon which it has established a scrap yard well equipped with cutting and handling machinery. The company has been placing some orders for equipment for this yard.

A special meeting of the Lake Superior Corporation will be held March 1.

POINTERS ABOUT NEW BUSINESS

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The following manufacturing companies have filed articles of incorporation:

The Reeves Bolt Co., Macon, Ga.; $10,000; by F. B. Stubbs, F. W. Armstrong and C. W. Reeves.

The Brooklyn Tool Co., Brooklyn, Ind.; $10,000; directors, J. S. Spoor, H. T. Blake and Iola Spoor.

The Southern Foundry Co.; Nashville, Tenn.; $10,000; by W. L. Looney, A. J. Witt, Paul W. Hoggins.

Jamison Machine Co., St. Joseph, Mo.; $10,000; by William E. Jamison, William T. Jamison and John B. Jamison.

E. R. Hensel Steel & Copper Co.; St. Louis; by S. M. Hensel and A. Burmeister; to manufacture and deal in metals; $10,000.

The Nye Gas Machine Co., Laporte, Ind.; by J. R. Nye, H. B. Johnson and C. F. Peterson; manufacture gas engines and appliances; $75,000.

The Gary Screw & Bolt Co., Gary, Ind.; $400,000; by W. F. McKenzie, N. E. Crull and H. I. Allen; to manufacture iron and steel products.

The Wells Foundry & Machine Co., East Gary, Ind.; $40,000; by George Earle, William Earle, V. E. Cook, S. E. Cook and C. W. Barnes.

The Arch City Foundry, Columbus, O.; metal castings and general foundry; $10,000; by W. H. Jones, R. W. McCoy, N. F. Ustick and R. E. Pfeiffer.

The Bremen Mfg. Co., Bremen, O.; caloric or hot air pumping engines; $50,000; by A. F. Turner, J. E. Purvis, H. M. Shelhamer, P. D. Turner and H. E. Young.

The Producers Supply & Tool Co.; Marietta, O.; tools and scrap metal; $30,000; by E. W. LeFever, Mollie M. LeFever, May Ruby, Ike Ruby, and David Ruby.

The Lewis Electric Welding & Mfg. Co.; Toledo, O.; $10,000; electrical and mechanical appliances; by G. L. Lewis, Frank W. Otis, Ewald Preues, H. W. Fraser, E. J. Marshall.

The Vanadium Steel Co., Morgantown, W. Va.; by Albert Loeb, John M. Gregg, William H. Brand, Anton Mornisch, Leopold Sigwart, A. R. Price, and John A. Purington, all of Morgantown, W. Va.; $50,000.

The Howell Mfg. Co., St. Louis, Mo.; manufacture and deal in railway equipment; $10,000; by Wilbur E. Howett, Juliet C. Howett, St. Louis, Mo.; George Barnett, of Webster Groves, Mo.

Martels Water Heater Co., St. Louis, Mo.; $10,000; manufacture gas and water heaters, etc.; by H. E. Martels, J. E. Diamond, C. E. Martels, St. Louis, Mo.; and Charles Von Martels, Woburn, Ill.

The Tennessee Manganese Co., East Liverpool, O.; mining and marketing minerals, including manganese, kaolin and clay; $50,000; Thomas H. Sant, John Sant, A. G. Smith, D. H. Litten, and P. M. Smith.

The Vaile-Kirnes Co., Dayton, O.; to manufacture hydraulic, electrical and pneumatic machinery; $100,000; J. Henry Vaile, Hugh W. Kirnes, Claude E. Burnett, David L. Strange and Oscar M. Gotschall.

The Cleveland Smelting Co., Cleveland; smelting, refining and dealing in ores and metals; $25,000; by William A. Bickford, Charles H. Bickford, Charles V. Burke, J. A. Burke, and William A. Byrnes.

The Wilsonia Brass & Bronze Works, New York City; brass and bronze articles, etc.; $2,000; Morris Koppelman, 594 Prospect avenue; David Wilson, Rose Wilson, 1054 Kelley street, all of Bronx, New York City.

The Frank Piazza Co., Brooklyn, N. Y.; $100,000; to manufacture engines, machinery, etc., and structural iron work; Frank Piazza, Matthew Marsilla, Crescenzo Simonelli, all of No. 18 Conselyea street, Brooklyn, N. Y.

The Transportation Equipment Co.; New York City; articles and devices for railroad equipment; $350,000; by George L. Aichele; Isodor Nemwith, of Brooklyn; Edward Turner, Edward Kuhl, of Woodlawn, N. Y.; William K. Nugent, of Richmond Hill, N. Y.

General Industrial:—

The Vulcan Furnace Co., which recently removed its works to Warren, O., is ready to operate and will begin shortly turning out its product of mechanical stokers.

Ohio Seamless Tube Co., Shelby, O. has reduced its capital stock from $500,000 to $350,000.

These directors were elected at the recent meeting of the St. Louis Brass Mfg. Co., St. Louis: Ray V. Owen, E. F. Guth, O. D. Guth, C. M. Wempner and Charles Michel.

The Baldt Steel Co., Newcastle, Del., recently shipped one of the largest steel castings made in the east. It weighed 125,000 pounds and was shipped to the Niles-Bement-Pond company, to be employed in building a press for making automobile parts.

At the annual meeting of the Hastings Foundry & Iron Works, Hastings, Neb., the following officers were elected: President and manager, C. G. Wallace; secretary and treasurer, A. H. Farrens; vice president, C. B. Hutton; cashier, D. Mahoney. Messrs. Farrens and Wallace, together with the following, compose the board of directors: A. L. Clarke, Carson Hamot and G. H. Buchard. A dividend of 12½ per cent was declared. A new building is rapidly nearing completion and will be occupied by March 1.

Trade Notes:—

The Pawling & Harnischfeger Co., Milwaukee, Wis., builder of cranes, hoists, etc., announces the opening of a branch office at 533 Baronne street, New Orleans, La., under the management of T. W. Waddell.

The Champion Rivet Co., Cleveland, announces the appointment of A. M. Castle & Co., of Chicago, represented on the Pacific coast by R. L. Sanford, 841 Monadnock building, San Francisco, and A. M. Castle, 430 Citizens National Bank building, Los Angeles, as its exclusive Pacific coast agents.

Fires:—

The machine shops of the Morgantown & Kingwood railroad, near Morgantown, W. Va., were badly damaged Feb. 8. Three locomotives were also damaged; the entire loss being estimated at $15,000.

The pattern shop of the navy yard, Washington, D. C., was recently badly damaged, the loss being estimated at $20,000.

Motors for Driving Main Rolls of Steel Mills[1]

The Advantages of Electric Drive in Rolling Mills for Operating Blooming, Billet, Rail, Structural, Plate, Wire, Merchant and Sheet Mills

By Brent Wiley[2]

One of the most important problems now receiving the consideration of steel manufacturers is the question of reduction of power costs; for, while the cost of power for rolling steel is only a small percentage of the total cost of its manufacture, the aggregate cost of fuel represents a large amount, due to the exceedingly large tonnage of the mills.

There are two efficient methods of accomplishing a reduction of power costs:

First, by the installation of gas engines using blast furnace gas, connected to drive electric generators.

Second, by the installation of low pressure steam turbines operating on exhaust steam from the mill or other power engines, for driving electric generators.

It is not practical to connect the gas engine or the exhaust turbine direct to the rolling mill, but the best solution is to transmit by means of electricity the cheap power thus obtained. This requires motor drive on the main rolls. In some cases, especially with small plants, the advantages of this form of cheap power for supplying electric drive to the auxiliary apparatus, are sufficient to warrant the extra first cost, even to the extent of abandoning the old engine-driven power apparatus.

The advantages of electric drive are constant and regular torque; more reliable drive, less breakage of couplings, pinions, etc.; less room required, by reason of absence of boilers, pipes etc.; easy adaptation of motors to

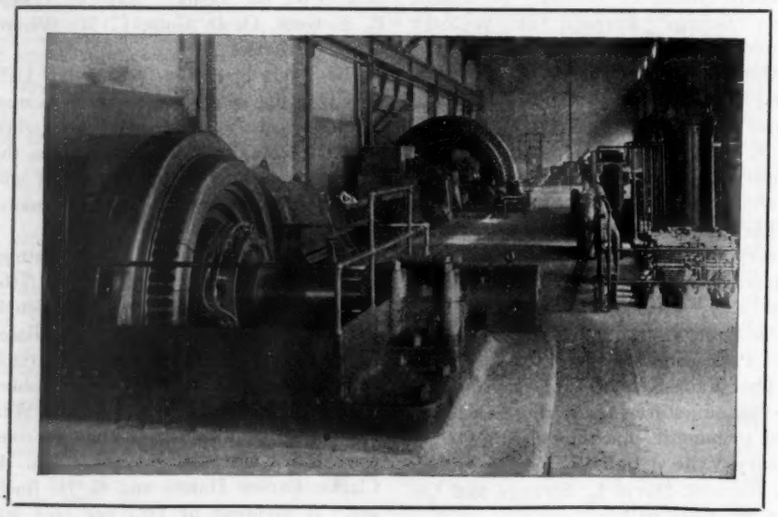


FIG. 1—MOTORS OF 3,200 AND 650 HORSEPOWER CAPACITIES, RESPECTIVELY, DRIVING THE MAIN ROLLS OF THE 18-INCH MERCHANT MILL SHOWN IN FIG. 7

mill; easy distribution of power by means of electric cables, instead of steam or gas pipes; easy and simple control of the power; centralized power generation; less labor; lower fuel costs; less oil and other stores, and the use of gas engines of medium size in the power station. In addition, the output may be increased at times on account of the economical speed variation that can be obtained with motors, where it is desired to finish the light material at a higher speed than the average product. Alternating current motors can be designed with windings for two speeds, and sometimes two units with cascade connections are used to give the required speed changes.

Electric drive for the main rolls of steel mills has also a great many advantages that cannot be capitalized directly, but which will be very effective in the furthering of this comparatively recent development. One of the principal incidental advantages is the facility afforded for obtaining accurate records of the power required, such as that shown in Fig. 3. The exact operating conditions can be definitely determined at any time by means of indicating and integrating meters. This condition is quite in contrast with the problem of power readings for steam engine drive. The many automatic and protective features of the auxiliary motor drives also permit a better arrangement of the mill and more economical operation by reducing the number of operators required.

During the past four years approximately 150,000 horsepower in large motor units for the operation of rolls have been installed in steel mills, including drives for blooming, billet, rail, structural, universal, plate, wire, merchant, re-rolling and sheet mills. Test data from these various mills will do much to advance the art of rolling. The power requirements can be studied in detail and the reduction

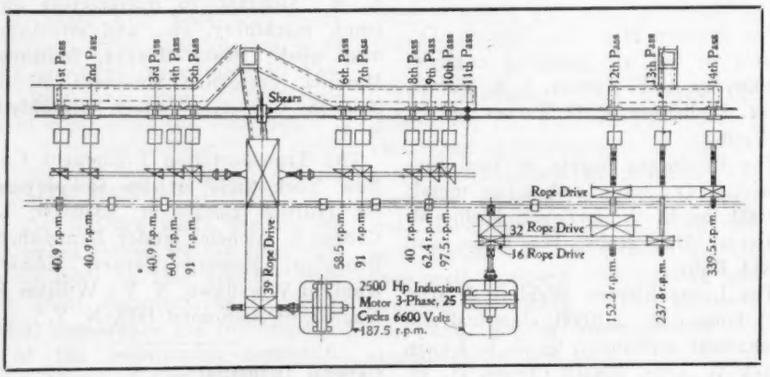


FIG. 2—GENERAL ARRANGEMENT OF THE SKELP MILL OF THE NATIONAL TUBE CO., LORAIN, O.

[1]From *The Electric Journal*, February, 1911.
[2]Commercial engineer of the Westinghouse Electric & Mfg. Co.

schedule can be worked out for greatest economy of power and time. Power instruments give indication of any disorder in the mill proper, thus enabling the mill foreman to prevent excessive friction loads and excessive wear of parts due to poor alignment, excessive thrust and bearing pressure.

Commercial Efficiency.

The question of commercial efficiency is the principal item to be considered, and it is quite complicated, owing to the fact that as conditions vary greatly in different plants a separate analysis must be made of almost every case.

The United States Steel Corporation and many other steel companies are making a careful study of this particular subject in order to improve the economy of their present works. In many plants it is not practicable to consider the gas engine proposition. The number of furnaces may not be sufficient to insure reliable operation or the plant may not include blast furnaces; or again, the first cost of the installation may be prohibitive, being very much more expensive than a low pressure steam turbine equipment of equal capacity. On the other hand, by the use of the exhaust steam turbine taking steam from non-condensing engines, an increase of 75 per cent of the power developed by the engine can be obtained without additional fuel consumption.

The several mill plan views shown give an idea of different mill arrangements and methods of drive. In several merchant mill propositions a motor for each stand of rolls has been considered, but in every case it has been found best to reduce the driving units to two, from a standpoint both of first cost and of mill design. It will be noted that in the Indiana Steel Co.'s merchant mills the second motor is used to drive the finishing pass only. In existing merchant mills, where all of the roll trains are connected together and consequently all are running at the same speed, it will often be found advantageous to install a motor to drive the last set of rolls or perhaps the last two, thus giving an opportunity to speed up these rolls and thereby get the long material out of the mill more quickly. This is especially true in the smaller mills (8 inches to 10 inches). The Illinois Steel Co. tried out this scheme in its Milwaukee 8-inch merchant mill with splendid success, increasing the output several per cent due to the more nearly continuous operation of the mill.

Direct current motors have been installed in some cases in order to secure the advantage of speed variation.

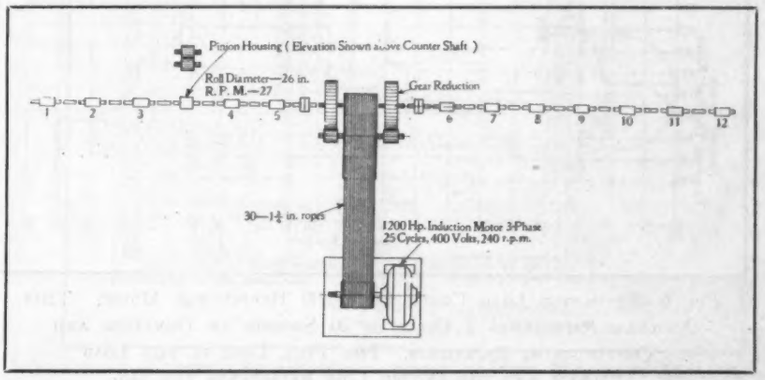

Pinion Housing (Elevation Shown above Counter Shaft)
Roll Diameter—26 in.
R. P. M.—27
Gear Reduction
1 2 3 4 5 6 7 8 9 10 11 12
30—1¼ in. ropes
1200 Hp. Induction Motor 3-Phase
25 Cycles, 400 Volts, 240 r.p.m.

FIG. 4—GENERAL ARRANGEMENT OF THE SHEET MILLS OF THE SENECA IRON & STEEL CO., BUFFALO. BOTH TOP AND BOTTOM ROLLS OF NO. 3 MILL ARE DRIVEN, BUT ON THE OTHER MILLS THE BOTTOM ROLL ONLY IS DRIVEN

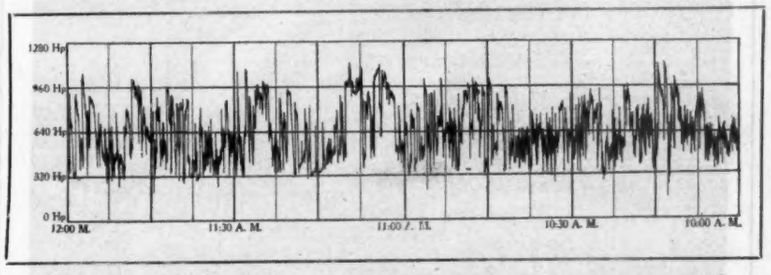


FIG. 3—GRAPHIC WATTMETER CURVE FOR 1,200-HORSEPOWER MOTOR ON THE ROLLS OF THE SHEET MILL AT THE PLANT OF THE SENECA IRON & STEEL CO., BUFFALO

The present tendency is, however, toward the exclusive use of alternating current at voltages of 2,200 to 6,600 volts, at 25 cycles, three-phase. The lower frequency allows much cheaper construction of large sized, slow speed motors, while the higher voltages afford many advantages in the distribution of power in large plants. The motors are of the induction type with phase wound secondaries.

In estimating a motor for this type of work a load diagram of the torque required during a complete cycle of operations is first drawn up as shown in Fig. 6. Such a load diagram gives the exact nature of the load conditions including variation of load and the time element, and this information is essential in calculating the proper

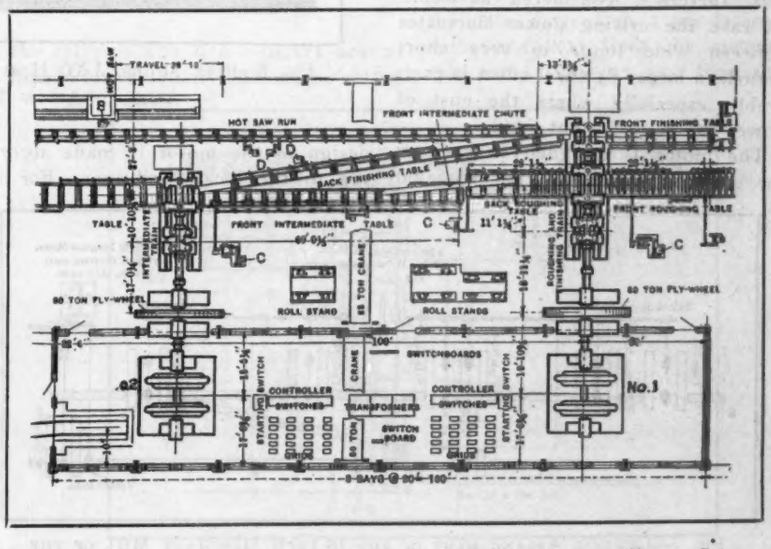


FIG. 5—GENERAL ARRANGEMENT OF THE LIGHT RAIL MILL, SOUTH WORKS, ILLINOIS STEEL CO., SOUTH CHICAGO, ILL.

capacity of the motor and the necessary flywheel effect to be included in the system. The full line in Fig. 6 shows the calculated load diagram for the motor driving the main rolls of the 18-inch merchant mill of the Indiana Steel Co. This motor, as shown in Fig. 7, drives rolls for eight passes. The rolls of the ninth or finishing pass are driven by a smaller motor which develops approximately 660 horsepower for 12 seconds in each 20-second period. The diagram shows a maximum requirement of approximately 4,500 horsepower and a minimum of less than 1,000 horsepower during each 20-second period. Owing to the flywheel effect, the load on the motor is slightly reduced or equalized as shown by the dotted line. In this particular case the power required is not subject to extreme variations, and, moreover, the cost of power is low. A comparatively low flywheel effect was, therefore, considered advisable. In case the driving power fluctuates between wide limits in very short periods, a larger flywheel effect is preferable, especially where the cost of power is an important item.

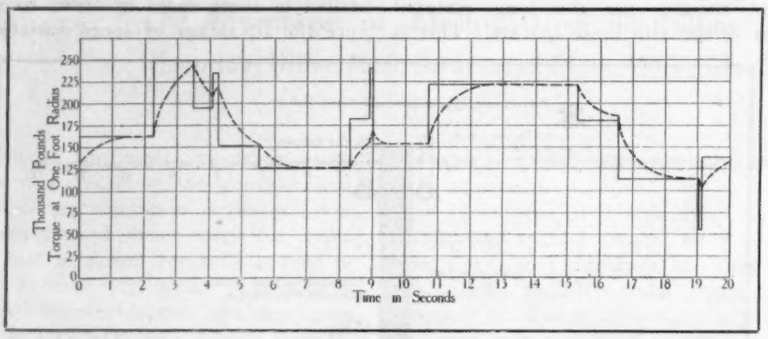


FIG. 6—ESTIMATED LOAD CURVE FOR 3,200 HORSEPOWER MOTOR. THIS DIAGRAM REPRESENTS A CYCLE OF 20 SECONDS IN DURATION AND CONTINUES BY REPETITION. THE FULL LINE IS THE LOAD DIAGRAM AND THE DOTTED LINE REPRESENTS THE MOTOR LOAD WITH FLYWHEEL EFFECT OF 3,000,000 POUNDS AT ONE FOOT RADIUS

The motor is designed to perform the work as shown by the estimated load diagram at a safe temperature rise, or, in other words, is figured on an intermittent load basis, and thus the continuous rating given the motor is really an arbitrary one. The design of the motor is made according to the local conditions. For instance, where rope drive is used, giving flexibility between the motor and mill shaft, it is not necessary to make the motor excessively strong; the speed can be moderate instead of exceptionally slow, as is generally the case when the mill shaft is driven direct, and the rope sheaves give opportunity to place the necessary flywheel effect outside the motor, a good point where exceptional mechanical strength of motor is not actually required.

The 3,200-horsepower induction motor designed to perform the work indicated in Fig. 6, is illustrated in Figs. 1 and 8. This motor weighs approximately 300,000 pounds and has approximately 2,500,000 pounds flywheel effect included in the rotor, which is so designed that additional weight can be added to it should additional flywheel effect be desirable. The illustrations give a good idea of the general mechanical characteristics of the machine.

The primary (or stator) is of the open slot type, wound with form-wound coils made of rectangular strap copper, thoroughly insulated and impregnated before winding. The coils are supported rigidly at the outer ends by means of an insulated steel ring fastened to the frame by a number of strong brackets. Means are provided for adjusting the stator vertically and horizontally at right angles to the shaft for adjusting the air gap, and also for moving the stator parallel to the shaft to allow for inspection or repairs.

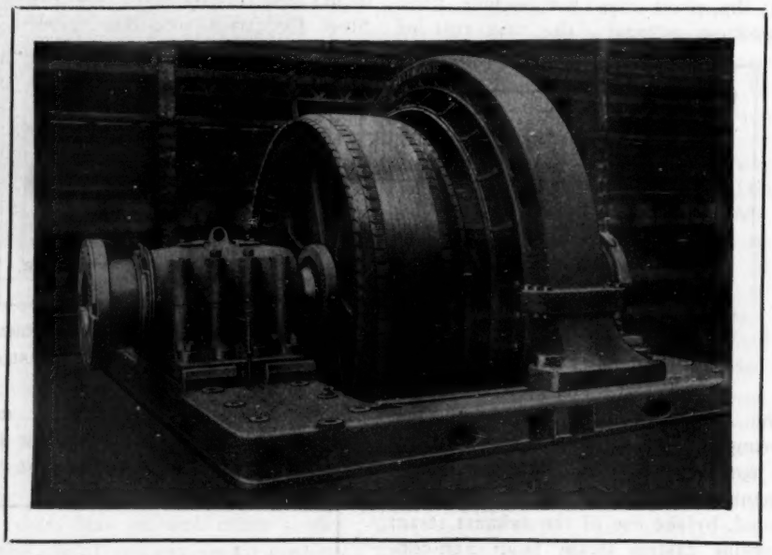


FIG. 8—ROLL MOTOR, 3,200 HORSEPOWER CAPACITY, WITH STATOR MOVED ASIDE TO ALLOW INSPECTION OF THE ROTOR

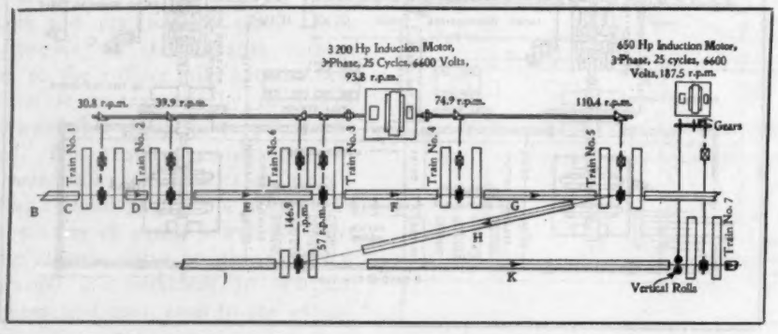


FIG. 7—GENERAL ARRANGEMENT OF THE 18-INCH MERCHANT MILL OF THE INDIANA STEEL CO., GARY, IND.

The slot construction of the secondary, while of the partially enclosed type, thus tending to compensate for

the effect of the unusually large air gap provided in such motors, permits the use of a completely insulated form-wound coil. The overhanging tooth of the laminations assists materially in retaining the fiber wedge in place. This is of especial importance in the secondary as it is in the revolving part. Band wires for retaining the overhung portions of the coil in place are objectionable, particularly from the standpoint of repairs when all work must be done in the field. A sectional ring is used in place of band wire on this machine, as shown in Fig. 8.

Thrust bearings are provided whose object is to care for ordinary thrusts due to wear of coupling boxes, but not excessive thrusts due to breaking of mill spindle. To provide for these thrusts the rotor is sometimes arranged to have a lateral movement of several inches without damage to any part except the holding bolts of the thrust bearings. Provision is made for shifting the entire brush rigging with the rotor so that the brushes will always stay on the collector rings. The thrust bearings are located at the end of the shaft opposite the coupling and are held by two bolts which are turned at one place to provide a breaking point. The bolts which pass through the bearing pedestal, together with the bed plates and parts, are designed to withstand the breaking stress of the holding bolts without injury.

The control outfit for this motor consists of two identical three-pole, single-throw, interlocking primary line switches with oil immersed contacts, (one switch for each direction of rotation), a group of magnet switches with the necessary secondary resistance and with current limiting relays, a reversing, drum type master switch, and shunt and series transformers for the relays. The line switches are so interlocked that only one can be closed at a time, and neither can be closed while the secondary switches are in other than the off position, that is, unless the secondary resistance is all in circuit. The line switches can be operated from the control pulpit or from the motor house. When the control circuit is open in the motor house the master switch and line switch operating mechanism in the pulpit are inoperative. Should the line switch be opened for any cause, or should the control circuit fail, all switches are immediately opened.

Motors in this service are seldom reversed, these cases arising only where material curls and tends to form a collar or for other reasons forms a cobble in the rolls. They start with resistance in the secondary circuit. As the speed increases this resistance is cut out by means of the magnet switches, each of which is under the control of the master switch, but is so connected as to automatically limit the current to a pre-determined value and also limit the current to this same value at any time during

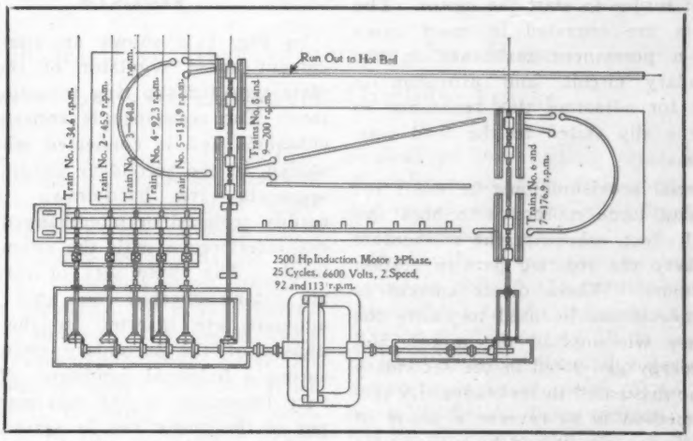

Run Out to Hot Bed
Train No. 1–34.6 r.p.m.
Train No. 2–45.9 r.p.m.
Train No. 3–64.8 r.p.m.
Train No. 4–92.3 r.p.m.
Train No. 5–131.9 r.p.m.
Trains No. 8 and 9–300 r.p.m.
Trains No. 6 and 7–176.9 r.p.m.
2500 Hp Induction Motor 3-Phase, 25 Cycles, 6600 Volts, 2 Speed, 92 and 113 r.p.m.

FIG. 10—GENERAL ARRANGEMENT OF THE 10-INCH MERCHANT MILL, INDIANA STEEL CO., GARY, IND.

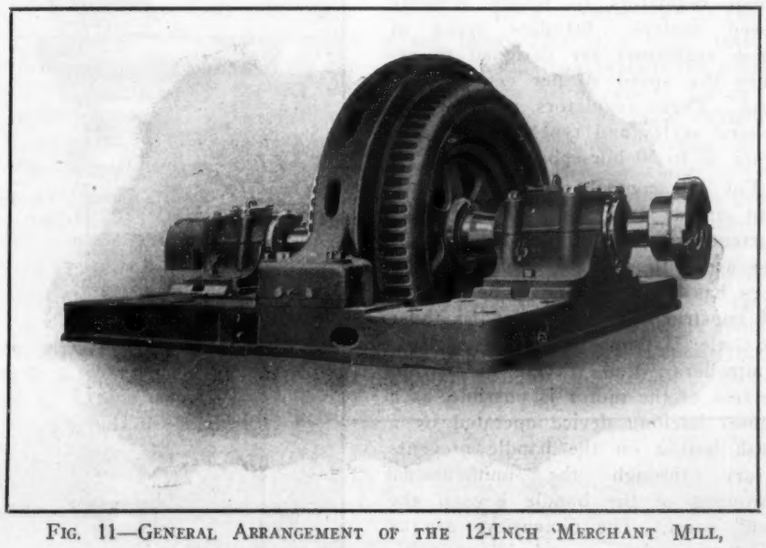


FIG. 11—GENERAL ARRANGEMENT OF THE 12-INCH MERCHANT MILL, INDIANA STEEL CO., GARY, IND.

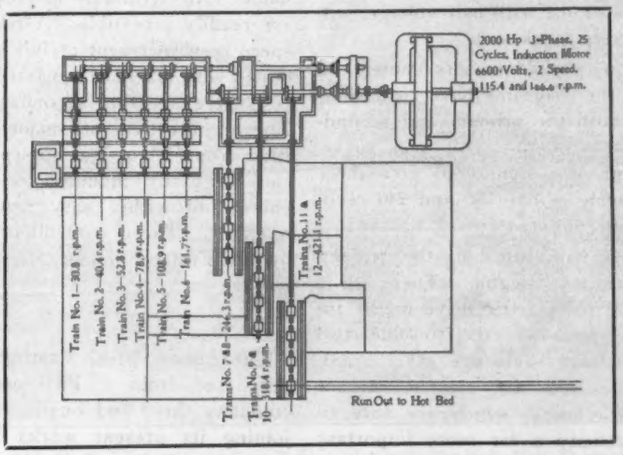

2000 Hp 3-Phase, 25 Cycles, Induction Motor 6600-Volts, 2 Speed, 115.4 and 144.6 r.p.m.
Train No. 1–30.8 r.p.m.
Train No. 2–43.4 r.p.m.
Train No. 3–52.8 r.p.m.
Train No. 4–78.8 r.p.m.
Train No. 5–108.7 r.p.m.
Train No. 6–161.7 r.p.m.
Trains No. 11 a 12–421.1 r.p.m.
Trains No. 7 & 8–246.3 r.p.m.
Trains No. 9 & 10–184.1 r.p.m.
Run Out to Hot Bed

FIG. 9—ROLL MOTOR, 600 HORSEPOWER CAPACITY, OPERATING FINISHING ROLLS OF AN 18-INCH MERCHANT MILL

starting, except that the first notch of the controller is arranged to give sufficient torque to start the motor. The motors are operated in most cases with a permanent resistance in the secondary circuit, and provision is made for adjusting this resistance to cause a slip suited to the load condition.

Special provision must be made for stopping large motors with high flywheel effect, otherwise the momentum will keep the rotating part in motion for hours. Where direct current is available it can be used to excite the primary windings of the motor, and the energy generated in the secondary can be dissipated in resistance. A second method is to reverse a phase of the primary circuit and by means of a suitable auto-starter impress on the

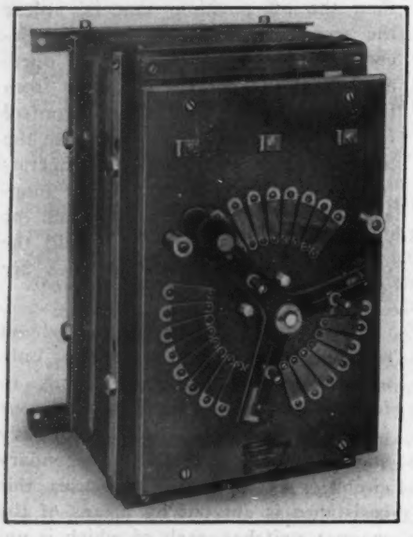


FIG. 1—ALTERNATING CURRENT REGULATOR OF THE FACE PLATE TYPE

primary about one-half the normal voltage. The latter method, "plugging" the motor with half voltage, will cause a very quick stop.

The two-speed motors noted in some of the diagrams have two windings on both the primary and secondary and it is possible with such an arrangement of windings to give three speeds, such as 120, 180 and 240 revolutions per minute.

The electrification of the rolling mills has just begun. There is a great field for electric drive in the future developments of the iron and steel industries, and there are other applications, such as the electric furnace for steel refining, which are sure to give electricity a far more important place in these industries than it has held in the past.

Alternating Current Controllers

In Fig. 1 is shown an alternating current speed regulator of the face plate type for slip ring induction motors. The resistance is entirely self-contained and is connected when installed, in the secondary circuit. The segments are hard-drawn copper, readily replaced or interchanged without interference with the connections inside. The three sets of resistance are star-connected so that equal amounts are inserted in the three phases of the secondary circuit, insuring a balanced condition. This is very important as the maximum output of the motor can be seriously affected by unbalanced current or voltages in the legs of the motor. Special resistance wire, having a zero temperature co-efficient, is used in the small regulators to insure accurate speed control. Standard types of these regulators are designed to reduce the speed 50 per cent at full load. These regulators are made in several styles and types and in sizes from ¼ to 50 horsepower.

For the control of machine tools and similar equipment an alternating current drum type controller, Fig. 2, for use with slip ring induction motors, has been designed. The features of construction are similar to those of Cutler-Hammer direct current drum controllers. Full reverse of the direction of the motor is possible, as a center latching device operated by a push button on the handle prevents injury through the unintentional throwing of the handle beyond the "off" point. The dimensions are as small as satisfactory design permits. the brushes and contacts are made of hard-drawn copper and are so mounted that replacements can be easily made. All terminals and other parts are readily accessible. A reduction of speed of 60 per cent at full load is obtained with standard apparatus through resistance in the secondary circuit. These controllers are made in capacities from 1 to 7½ horsepower and can be easily mounted on the machine tool within easy reach of the operator. These controllers are built by the Cutler-Hammer Mfg. Co., Milwaukee.

The Union Steel Casting Co. has purchased from a Pittsburg railway company three and one-half acres adjoining its present works along the Allegheny Valley Railroad Co., near the Sharpsburg bridge, Pittsburg, on which a large addition to the present plant will be erected. Plans for the proposed addition have not been completed. Recently the company secured an option on 20 acres near Tarentum, Pa., on which it was intended to build a new plant, but this plan has been abandoned.

A New President

The directors of the Birmingham Rolling Mill & Horseshoe Co., Bessemer, Ala., last week elected D. O. Jacoby, of Middletown, O., to succeed N. K. Reed, of the same city, as president of the company. Mr. Reed's retirement is due to illness; he still remains a director. Other officers elected were: Vice president, G. P. Martin, Bessemer; secretary, R. Smith, Bessemer, chief engineer, E. L. Penruddock, Birmingham.

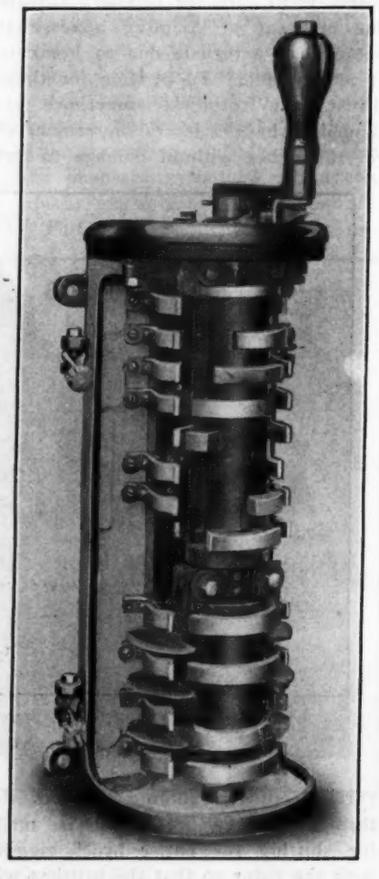


FIG. 2—DRUM TYPE ALTERNATING CURRENT CONTROLLER

It was announced that the horseshoe department of the company's new plant would be operating within 90 days and that the rolling mill department would not be completed until the other departments are oper-

Motor Trucks for Hauling Steel, Machinery, etc.

Modern Power-driven Vehicles Have Many Advantages Over Horse Trucks in Handling Heavy Loads — Features of Gasoline Trucks

Even to a casual observer, one of the most striking characteristics of the iron and steel industry is the widespread employment of labor-saving machinery for handling materials. From the ore mine down through the various processes of manufacture, the material is handled by power-driven equipment, hand labor being almost entirely eliminated. In one direction, however, even the iron, steel and machinery business has been backward in adopting improved facilities, for in short hauls through city streets, the horse and wagon still holds sway. But progress can no longer be stayed and in this service the days of the horse are numbered. The modern motor truck, driven either by gasoline or electricity, has now been brought to such perfection that it is rapidly being adopted in all branches of the iron trade and is driving the horse from the field. One reason for the advance of the motor truck is because its superior efficiency, power, capacity and speed adapts it so much better to modern conditions of distribution.

There is a curious inconsistency in shaving railroad freights by fractions of a cent per ton mile by means of improvements in mechanical appliances and in paying as much as 50 cents a ton mile for hauling the same articles by horse and wagon from the shop to the depot. It is only natural that as soon as the motor truck reached even approximate perfection manufacturers turned to it for relief, utilizing it to bring trucking costs somewhat in line with other transportation costs.

It now costs a certain Chicago firm, handling heavy castings, 8 cents per ton mile by motor truck whereas the cost with horse vehicles was 30 cents a ton mile. This is a large saving but does not fully represent the possibilities of the motor wagon, for even 8 cents a ton mile is high. This is the great fundamental reason why owners of foundries, machine shops, steel plants and manufacturers in general are using the motor truck—it saves them money.

But to realize a saving from the employment of motor vehicles, they must be operated under suitable conditions with a knowledge of both their possibilities and limitations. Some analysis of the trucking problem, as it confronts the iron, steel or machinery manufacturer or jobber is, therefore, necessary.

Practically every manufacturer or jobber is obliged (1) to deliver less-than-carload freight shipments to the railroad freight depot; (2) in seaport or lake cities to deliver all water shipments to docks or piers; (3) to haul incoming freight from stations, warehouses or docks; and (4) to deliver goods to customers in the same or nearby suburban towns.

To a certain extent motor trucks, of special types, are employed to advantage in handling materials through the plant or from shop to shop in place of industrial railroads, push cars and hand labor.

Coming now to the cost of operation, the accompanying tables, which have been carefully compiled, show both horse and motor truck expense under various conditions. Table I gives average figures obtained from the records of 7 owners of horse-drawn and motor-driven trucks. The *Average Annual Expense* covers interest at 5 per cent on the investment, the cost of operation including fuel,

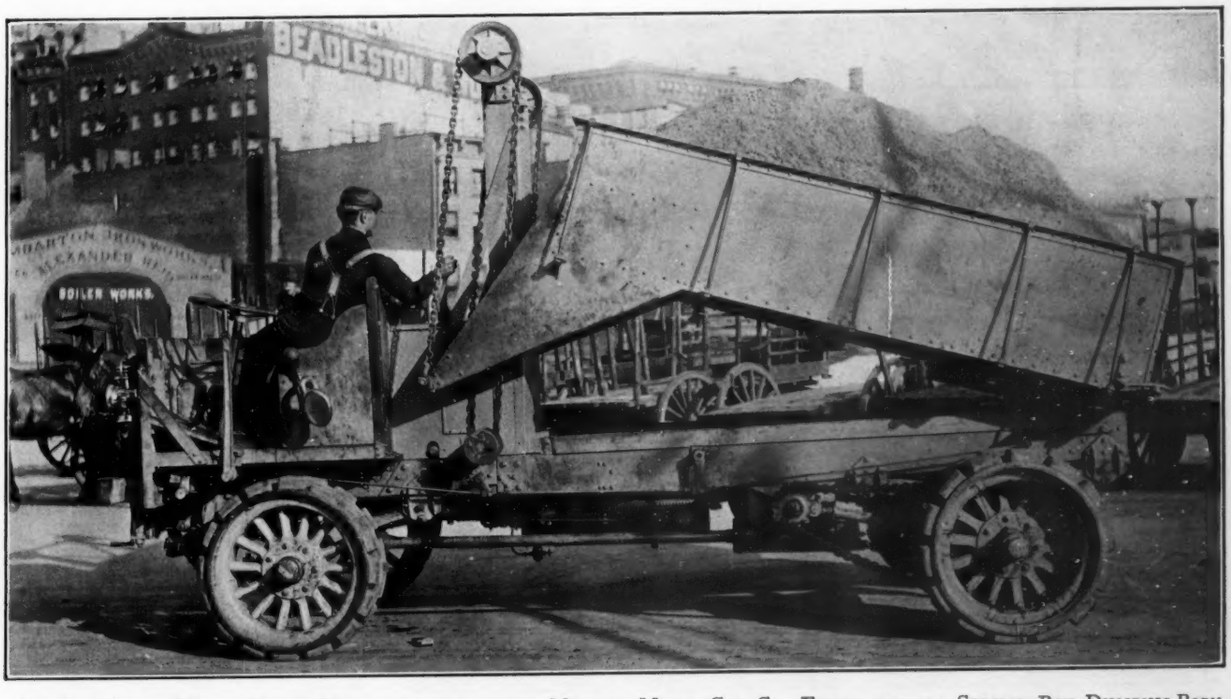


FIG. 1—HEWITT MOTOR TRUCK MANUFACTURED BY THE METZGER MOTOR CAR CO., FITTED WITH A SPECIAL BOX DUMPING BODY, FOR HAULING SAND, COAL, ASHES, SLAG, ETC.

FIG. 2—PACKARD THREE-TON MOTOR TRUCK OWNED BY THE SINGER SEWING MACHINE CO., NEW YORK CITY

FIG. 3—PACKARD THREE-TON MOTOR TRUCK OPERATED BY THE MICHIGAN STOVE CO., DETROIT

FIG. 4—A GRABOWSKY TWO-TON MOTOR TRUCK HAULING RAW MATERIAL FOR THE AMERICAN CAN CO.

lubricating oil, repairs, replacements, storage, all wages both for drivers and helpers, and depreciation. It is interesting to note in this connection that the depreciation averaged 15 per cent for the motor-driven vehicle, while for horses, wagons and harness it was 28 per cent. It is also well to observe that the average number of stops made per day by the motor vehicles was 55 and ranged from 10 to 150; this influences greatly not only the cost of operation, but the depreciation as well.

Table II gives the comparative expenses of one heavy, 5-ton motor truck and three drays, it being established that a truck of this size will do as much work as three horse-drawn vehicles. These figures are from data compiled by the Bush Terminal Co., New York. Commenting on them an official of the Terminal Co. said: "It will be seen that according to this estimate, the $200 additional in the original purchase price of the motor truck, as compared with the cost of the drays, is amply made up by the great savings in operation and other items. In addition to this, it must be borne in mind that these figures do not include cost of stable rent, stable help and stable equipment, which is greater in the case of horses than for motors. I would say that these figures are not only unbiased, but they even favor the side of the horse dray more than it deserves. The life of a motor wagon can be definitely predicted. That of a horse is problematical. Furthermore, the application of a proper method in the matter of hauls will bring the cost of carting far below the estimates quoted, and, finally, the division of the city into delivery zones will result in speed and economies unthinkable when unsystematized horse truck service is used.

Expense Items.

The great trouble with most figures comparing the cost of motor and horse vehicles is that many important items of expense are omitted and the value of the comparison vitiated thereby. This is particularly true in tables giving the cost of horse service, for there are numerous items of stable expense that are frequently left out. Below are given two schedules, one showing the items of expense in motor truck operation and the other horse truck expenses which should be included to obtain a proper comparison.

Motor Truck Expense Items.

1.—Cost of truck and equipment.
2.—Depreciation.
3.—Maintenance.
(a) Parts required.

(b) Parts replaced through accident.
(c) Parts replaced not through accident.
(d) Gasoline.
(e) Oil and grease.
(f) Tires.
(g) Miscellaneous.
(h) Garage service.
1. Rent.
2. Washing.
3. Polishing.
4. Garage helpers.
(a) Machinist.
4. Insurance.
5. License.
6. General.
(a) Interest on investment.
(b) Wages.
(1) Drivers. (2) Helpers.
(c) Ferriage—tolls.

Horse Truck Expense Items.

A.—Wagon.
1.—Cost.
2.—Depreciation.
3.—Maintenance.
4.—Insurance.
5.—License.
B.—Horse.
1.—Cost.
2.—Depreciation.
3.—Maintenance.
(a) Feed.
(b) Hostler and attendants.
(c) Medical attendance.
(d) Stable rent.
(e) Shoeing.
(f) Water for washing.
(g) Blankets.
4.—Insurance.
C.—Harness expense.
1.—Cost.
2. Depreciation.
3.—Maintenance.
D.—General.
1.—Interest on investment.
2.—Wages.
(1) Drivers. (2) Helpers.
3.—Ferriage—tolls.

Aside from its superior economy, when operated under proper conditions, the truck is far ahead of the horse in point of service. Most branches of the iron trade are subject to considerable fluctuations. It is not uncommon for business to improve in volume over 50 per cent in 60 days. In such cases the motor truck may be operated as much as 20 hours daily to take care of a rush of business, which would be impossible if horses were used.

When a Motor Truck is Least Efficient.

An iron and steel jobber in a large central western city purchased a three-ton truck for heavy hauling. On a certain day it was used for short city deliveries in the morning and for long suburban hauls in the afternoon, thus affording an excellent example of the kind of service in which the power vehicle is both most and least efficient. The record of this day's work is exceedingly interesting. On the morning trip from the warehouse, 32 city

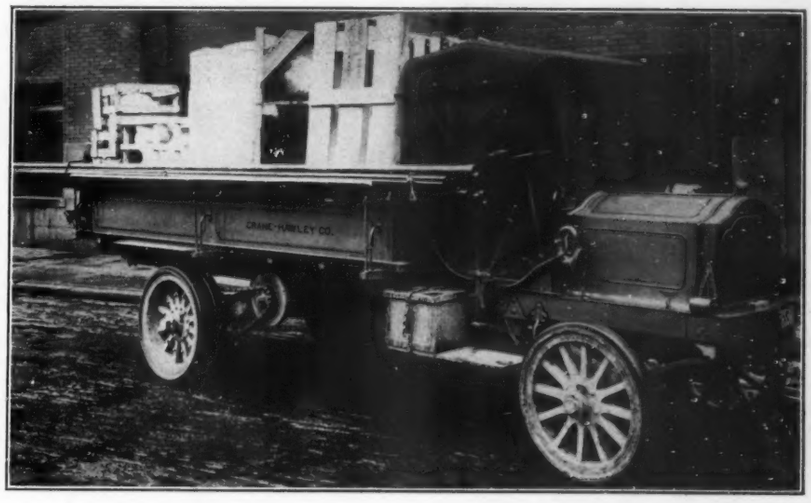


FIG. 5—PACKARD MOTOR TRUCK OPERATED BY THE CRANE-HAWLEY CO., CINCINNATI. THIS TRUCK WAS DELIVERED IN SEPTEMBER, 1909, AND HAS BEEN IN DAILY USE DELIVERING PIPE, BATH TUBS, ETC.

FIG. 6—MOTOR TRUCK USED BY THE TROY LAUNDRY MACHINERY CO., CHICAGO, FOR DELIVERING MACHINERY FROM ITS PLANT TO ITS WAREHOUSES, ETC. THIS TRUCK DOES THE WORK OF THREE TEAMS

FIG. 7—A FRANKLIN ONE-TON LIGHT DELIVERY TRUCK; THE WHEELS ARE FITTED WITH PNEUMATIC TIRES

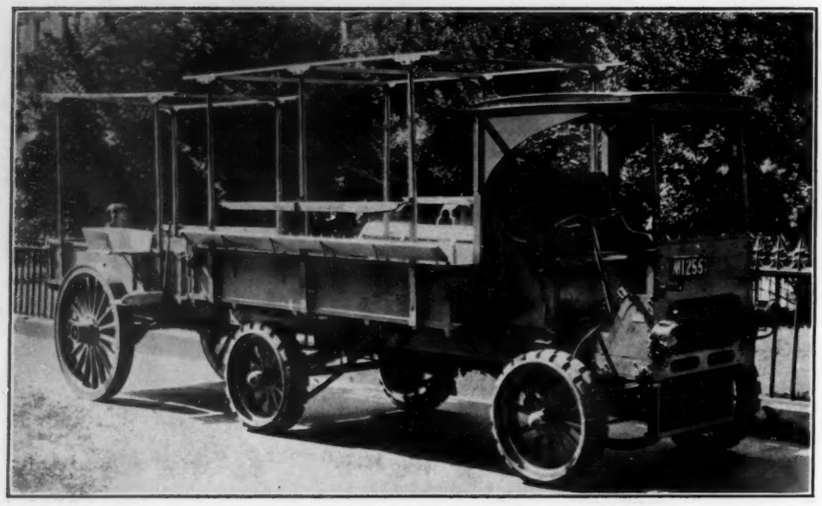


FIG. 8—HEWITT TRUCK FITTED WITH TRAILER, WHICH INCREASES THE HAULING CAPACITY OF THE MOTOR TRUCK WITHOUT INCREASING THE OPERATING EXPENSE AND OBVIATES THE DANGER OF OVERLOADING

FIG. 9—A FIVE-TON FRAYER-MILLER MOTOR TRUCK OPERATED BY THE OAKLEY COLONY TRANSFER CO., OAKLEY, CINCINNATI, O.

FIG. 10—STEARNS THREE TO FIVE-TON MOTOR TRUCK, FITTED WITH A STAGE BODY AND PLATFORM FOR HAULING HEAVY CASTINGS

customers were served and the distance traveled was 16 miles. This would be a scant day's labor for a double team, the average standing closer to 20 miles, except in winter and midsummer. But a three-ton motor wagon of this type, because of its heavier fixed charges, its interest on investment, depreciation, maintenance, etc., must do a little more than twice a team's work to produce any appreciable saving. At the best, therefore, this warehouse truck did no more than break even with its horse-drawn rivals.

The afternoon, however, supplied a contrasting tale. Turned to suburban deliveries—the service for which it was purchased—the motor made one round trip of 16 and another of 24 miles. Averaged, here was a full day's work for four horses. In the time allowed and after a morning's labor, the job would have overtaxed the best teams.

The power wagon, on the other hand, covered its fifty-sixth mile as easily as its first and covered the afternoon 40 as easily, though not in so short a time, as the morning 16. It made a net saving of at least $5 on the two trips—hired teams cost the company 60 cents an hour—while the service rendered was considerably beyond the ordinary range of draft horses.

A fairer or more instructive parallel between profitable and unprofitable power hauling could hardly be conceived. The same truck and same driver, on the same day, and with similar loads, earned nearly twice as much in the afternoon as in the morning. What caused the difference? Emphatically, the service conditions. The morning employment of the truck made the least of its time-saving and cost-cutting powers. There were stops every half mile; there were waits which cost three or four times as much per minute as did dray delays; there were no service demands which horses could not supply as well.

The afternoon deliveries, on the contrary, gave full scope to the power and speed in which the truck excelled. There were heavy loads to be moved farther and faster than teams could travel. Speed, therefore, made for efficiency no less than for economy. Stops were few—only eight as against the morning's 32—and delays minimized. In short, conditions were right, the task matched the capabilities of the machine and efficiency was the natural result.

The moral is reasonably plain. The first inquiry of the man with heavy

hauling in hand should be directed towards his service needs and conditions. Speed, capacity and distance are the three vital things the power wagon offers him—the things on which its economy is based. If he can't utilize them or if there is any circumstance which negatives one without compensating another, he is likely to find motor trucks unprofitable. Some companies, employing both team and power vehicles, fix eight miles as the minimum round trip for the latter.

Five Trucks Replace 13 Teams.

A Cleveland company purchased five White gasoline trucks to replace 13 teams of horses. Four of these trucks are 3 tons capacity and one 1½ tons. The 3-ton trucks each consume an average of 81 cents worth of gasoline and oil per day. On two successive working days the five trucks moved 187,000 and 172,000 pounds of freight, respectively. The four drivers of the larger trucks are paid $12 per week, while the driver of the smaller truck received $18 per week. The latter is a mechanic and his work includes the inspection of the other trucks as well as his own. In addition, this concern pays each of its drivers a bonus of $2 for every week during which no repairs are necessary, and it is worthy of note that each has received his bonus every week since the trucks were installed. "We have reasonably assured ourselves," writes one of the officials of the company, "that we can keep our White trucks in perfect order after paying all expenses, including 6 per cent interest on money invested and charging off the 25 per cent per year on the original cost of the trucks, and that our trucking will not cost us any more than previously—in fact, we expect it will be less, whereas there is no comparison in the convenience."

Motor Truck on Mountain Roads.

Iron water pipes, each 30 feet long by 4 feet 4 inches in diameter and weighing 3,300 pounds each, are being hauled in pairs over 17 miles of mountain roads in Oregon by motor trucks. Four 3-ton machines have been engaged for more than four months in this work, for the contracting firm of Schaw-Thatcher-Bowles, which is constructing a water supply line from Mt. Hood to Portland, Ore. The front ends of the pair of pipes are carried on the trucks and the rear ends ride on a pair of trailing wheels. An average of four round trips a day is made by each truck. Together they do the work of 32 horses and eight

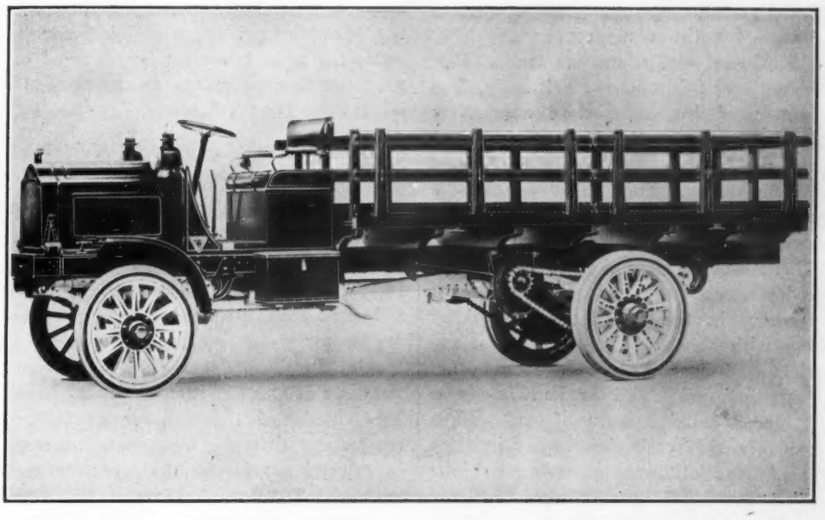


FIG. 11—PACKARD THREE-TON MOTOR TRUCK, EQUIPPED WITH A STANDARD CRIB BODY, DOUBLE SIDES AND TAIL GATES

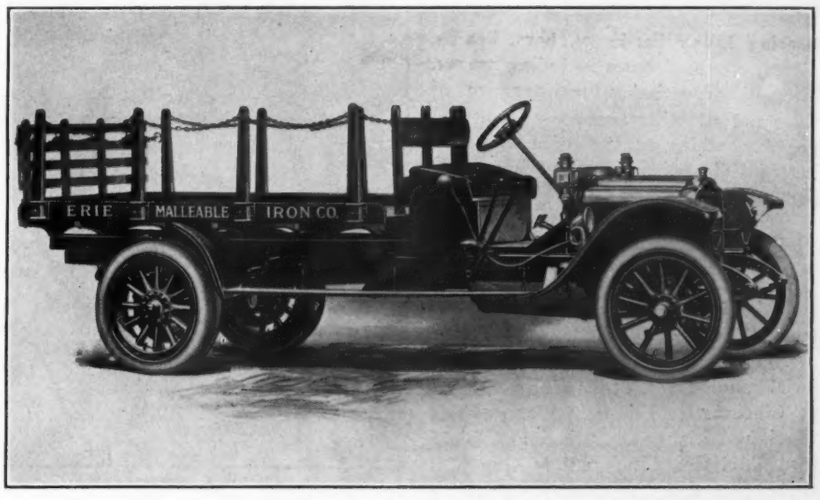


FIG. 12—WHITE 1½-TON TRUCK, EQUIPPED WITH A STRAIGHT PLATFORM BODY AND SHAFT DRIVE, OPERATED BY THE ERIE MALLEABLE IRON CO., ERIE, PA.

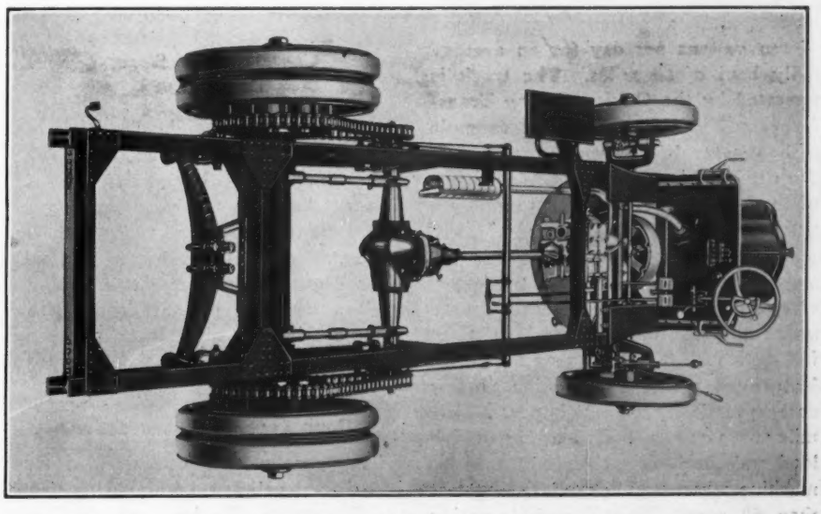


FIG. 13—VIEW FROM ABOVE OF A 30-HORSEPOWER WHITE THREE-TON TRUCK CHASSIS, CHAIN-DRIVEN

men, and are saving nearly $8,000 a month for the contractors.

A 3-ton Kelly motor truck, Fig. 1, with self-dumping steel body, has been used for some time near New York in handling cinders from a rolling mill to a tract of low ground about a mile away. Each load contains 7 cubic yards, or just double the load hauled in a horse-drawn wagon. The motor truck makes 10 to 12 trips a day as compared with an average of five or six trips made in a working day with horses. Thus the power vehicle is doing the work of four horse-drawn wagons, and is hauling from 70 to 84 cubic yards of material a day. In this case the saving in time is of especial importance because the filled ground is to be used for the construction of buildings that are badly needed by the owners.

The Chicago Iron Store, Chicago, uses a 5,000-pound Sauer truck, which takes the place of three teams in delivering heavy hardware, bars, beams, plates, etc., and costs including wages, interest, depreciation, maintenance of tires and all other expenses, about $12 per day, which, at the price of teaming in Chicago, makes a saving of 33 per cent.

One Truck For Several Firms.

A 3 to 5-ton Frayer-Miller air-cooled, 50-horsepower gasoline freight truck, Fig. 9, with standard box body, carries nearly all the castings and material handled by the following five firms at Cincinnati: Triumph Electric Co., Cincinnati Planer Co., Cincinnati Bickford Tool Co., Cincinnati Milling Machine Co., and the Modern Foundry Co. This truck does hauling between these plants, railroad terminals and warehouses in Cincinnati. It makes 15 miles an hour empty and 12 miles loaded, with a gasoline consumption of ten gallons per day for an average daily haul of 60 miles. The truck is operated by the Oakley Colony Transfer Co. This is an excellent example of how several firms may co-operate in the use of a motor truck when no one of them has enough work to employ a truck economically.

It will be noted in the above examples of successful motor truck service, that the machines were all used practically continuously and at their full capacity. This is a very important feature of efficient operation, for it costs practically as much per vehicle mile to carry a half load as a full load and the hourly charge of a $4,000 machine when standing idle is not less than 60 cents. In railroad operation the great principle governing freight movement is that revenue increases by the *ton mile* and expenses by the *train mile*; the same law must be observed in the operation of motor trucks to realize the greatest efficiency.

Extent of the Commercial Vehicle Industry.

The motor truck is not an off-shoot of the pleasure vehicle, as it dates back in France and England to 1763. In the United States there are now 130 companies producing and marketing motor trucks, delivery wagons and special forms of self-propelled industrial vehicles. Estimates that have been made of the number of motor trucks and delivery wagons at present in regular service in this country are between 20,000 and 25,000. In New York there are 8,400 commercial vehicles registered, while Chicago has about 900 trucks and wagons. The wagon and truck companies now in business have a production capacity of 20,000 motor trucks a year, with an aggregate estimated value of $50,000,000. These figures are small in comparison with the pleasure car, but all parts are heavier and larger, requiring more men and special machinery to produce them.

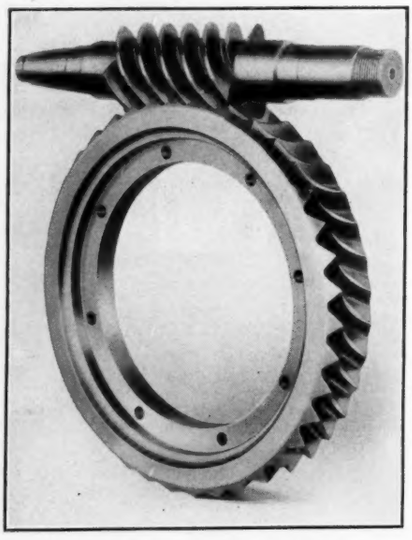


FIG. 14—WORM WHEEL OF A FIVE-TON PIERCE-ARROW MOTOR TRUCK. THIS IS A NEW FEATURE IN MOTOR TRUCK CONSTRUCTION. THE WORM IS LOCATED ABOVE THE REAR AXLE AND PRACTICALLY CONSTITUES A SHAFT-DRIVEN-CAR

Four Types of Construction.

The construction of motor trucks is being developed without any frills or adornments. Business men buy motor trucks on business principles. All types now on the market are built on the general principles developed in the pleasure car. Little change is made in the power plants except to make the engine bore and stroke larger and the engine heavier. General practice has divided the gasoline trucks now on the market into four general designs. In the first type, the driver sits at the rear of the engine, just in front of the load as in a pleasure car. This leaves a load space about 17½ feet in the rear on a wheel base of 14 feet. In this type of truck the load is balanced over the rear wheels and axle, permitting the use of lighter front springs to carry the motor, saving it from excessive jar and vibration when running empty. The motor is placed at the same height as the bed. Power is transmitted to the driving wheels by a shaft and two side drive sprockets.

In the second type the motor is mounted underneath the floor boards, bringing the driver's seat forward and partly over the engine. This brings the loading space forward and leaves very little overhang back of the rear axle. This construction gives a loading space of 11 feet with a wheel base of 11 feet.

The third type has the motor under the seat and floor boards and above the frame level. The driver sits high up commanding a clear view of the front, rear and both sides. The load carrying platform is practically the same length as the wheel base, both being about 13 feet, with very little overhang over the rear axle. For a load space of the same length, this gives a much shorter wheel base, with the same carrying capacity as the first type. This design is adapted for carrying long, heavy products such as water tanks. The fourth type of truck has the motor hung centrally, or approximately so, under the floor boards. This gives a load carrying space practically equal to the wheel base without much overhang back of the rear axle. The chassis construction gives a wheel base of 10 feet with a load space of 9 feet 6 inches.

The leading American manufacturers of the heavier gasoline vehicles have conflicting opinions as to how the driver's seat and the dash should be located with reference to the engine. In one design the engine is placed at the very front of the car and immediately back of the engine is the driver. This causes most of the load to bear down upon the rear axle. The makers of this style claim two distinct advantages. All parts of

the engine are always easily accessible and the weight of the load is kept off the forward axle, making the steering easier. For this purpose the rear axle is accordingly designed heavier.

In the other type, the driver's cab is located immediately above the engine. The makers of such machines claim that the driver has a better view of what lies ahead of him, the loading space between the axles is greater and the truck is not so long. The engine cannot be reached with facility. In a machine of this type it is imperative that a close watch be kept over all parts of the mechanism.

In large gasoline trucks a four-cylinder, four-cycle motor is used. The tendency is to make the motors as small as possible. The engine generally has a magneto ignition, mechanically operated valves, force-feed lubrication and pumped water circulation. The transmission, or speed changing mechanism, is generally of the sliding gear type. It is carried in a gear box under the center of the truck and is made of selected material to stand the enormous stresses to which it is subjected. The final drive is invariably by roller side chains from a differential countershaft to sprockets on the rear wheel brake drums. The axles are solid, one-piece forgings; the rear axle is usually a square cross-section and the front axle an I-section.

The chassis of commercial cars, at present, are built in four types: The pressed steel frame; the armored steel frame composed of sheets of steel reinforced by strips of ash or other hard wood all bolted together, giving the frame springiness; the angle iron frame, which is not so much in use now as a short time ago; and the heat-treated, chrome-nickel steel frame. Of these, the pressed steel and the chrome-nickel steel frames are most generally used.

Dump Bodies.

The chassis is supported on the axles by heavy leaf springs of the platform type. The driver's seat and the dash are built as an integral part of the chassis, but invariably the body is a separate unit, the chassis being so designed that any type of body may be put on. In the development of the motor truck, special tipping bodies are being used and applied in hauling coal, coke, cinders, slag and raw bulk material of a similar character. The White, Mack and Packard companies are among those making dump wagons of this type. In the Mack dump wagon the load is tipped from the same position in which it is carried, sprocket chains operated vertically from a train of gears being used. The chains pass over pinions mounted high at the rear of the driver's cab and thence down to the lower rear edge of the tip body where the ends are attached.

In the Reliance truck, however, the load is carried on all four wheels and the motor is mounted under the driver's seat. The tipping operation is automatic, at least with a full load. As soon as the body has been rolled far enough to the rear it over-balances and discharges itself. A crank actuating a train of spur wheels rotates a reel mounted crosswise flush with the top of the chassis and two endless chains attached to the body a little in front of the middle of the floor, underneath, draw the body up and down.

In the White dump wagon, the body is also moved to the rear about 16 inches before it is tipped. A many-stranded wire cable running over sheaves takes the place of the reel and chains, but the tipping is done in the same operation that rolls the body rearward. Two rigid levers, which are hinged in the chassis, force up the front end of the load. The front section of the roller rails is inclined upward to the rear so as to avoid a dead center strain against the levers at the beginning of the movement.

Many lines of business demand a truck body having a large volume capacity and these types require the support of the motor mechanism under the body of the truck. Special means are provided for carrying the motor at the extreme front, below and in advance of the radiator.

Body Design.

In body design there is a noticeable tendency toward the simplification of loading methods which the absence of the horse in front makes possible. This finds its application in placing the driver's seat in the center or to one side of the floor of the body, so that long pieces, such as metal bars, tubing and the like can be laid flat on the floor of the vehicle and easily secured. In the horse-drawn vehicle it is necessary to fasten such loads in an inclined position, so that the forward ends of the projecting pieces will clear the team in front.

The advent of the removable body has resulted in the invention of a number of ingenious devices for removing the entire body from the truck chassis. This allows the use of a number of bodies with one chassis enabling the power plant of the truck to operate continuously while the separate bodies are being loaded. Some special removable bodies are fitted with metal shoes so that they can slide sidewise from the frame of the motor truck to a horse-drawn yard truck, or vice versa. By means of a block and tackle operated by a lever on the motor truck, the body, whether empty or loaded, can be transferred in 10 to 30 minutes, according to circumstances. In some cases, to load the truck by hand without the removable body would require from half an hour to three hours. While the truck is delivering the load in one body another body is being loaded in the yards, so that the truck is kept busy continually.

Interchangeable Bodies.

One of the recent methods for handling removable bodies is the interchangeable body system of the Morgan Motor Truck Co., consisting of a truck chassis with two or more removable bodies and portable slips. The slips are compact platforms, which can be picked up by the truck if necessary and transported to any part of the factory or yard. This feature is appreciated by dealers whose haulage must be collected from variable points within a factory yard or loading enclosure. A truck with an empty body on the chassis, backs into the slip. As the truck backs in, the body is automatically lifted off the chassis and deposited on the track of the slip ready for loading. In the meantime a loaded body is awaiting transportation in an adjacent slip. The truck backs into this slip and by dropping a coupling pin, the loaded body is immediately connected to the truck. The operation of leaving an unloaded body and taking on a loaded body may be completed in five minutes.

Winches, operated either directly or through reduction gears, are used for lifting loads and for loading heavy material. When combined with trailers the hauling capacity of a standard truck is increased from 20 to 50 per cent. These trailers are built with wooden wheels and bed, and cost very little to operate when hauled by motor truck power.

Chicago Motor Truck Show.

Gasoline trucks now on the market, as exhibited at Chicago's first commercial truck show, Feb. 6 to 11, range in size from 500 pounds to 10 tons capacity. A majority of the trucks over 2 tons have four-cylinder engines with the horsepower rang-

TABLE I.

AVERAGE COST OF OPERATING MOTOR VEHICLES AND HORSE-DRAWN TRUCKS COMPILED FROM DATA FURNISHED BY 67 CONCERNS.

Type of vehicle.		Average cost	Average load, pounds.	Average miles, per day.	Average annual expense.	Average cost per vehicle mile, cents.	Average cost per ton mile, cents.	Remarks.
Horse drawn	1	$ 796	1,287	22.7	$1,392.74	20.4	31.7	Vehicles of all capacity.
Horse drawn	2	982	6,600	18	1,319.60	24.4	7.4	Over 2 tons capacity.
Horse drawn	3	1,008	2,545	22.4	2,023.64	30.1	23.6	Between 1 and 2 tons.
Horse drawn	4	715	690	23.2	1,195.32	17.2	49.8	Under 1 ton.
Motor driven	5	2,450	2,795	45.4	2,237.00	16.4	11.7	All capacities and motive powers.
Gasoline driven	6	2,308	2,395	47	2,174.00	15.4	12.9	Gasoline machines, all capacities.
Electric driven	7	2,750	4,925	23.50	2,223.00	31.5	12.5	Electric machines, all capacities.
Steam driven	8	3,000	900	100	3,460.00	10.7	23.8	Steam machines, all capacities.
Motor driven	9	3,564	7,255	30	2,857.00	31.7	8.7	All motor wagons over 2 tons capacity.
Motor driven	10	2,677	2,636	30	2,444.00	27.1	20.6	All motor wagons between 1 and 2 tons capacity.
Motor driven	11	1,655	640	61	1,814.00	10.0	31.2	All motor wagons less than 1 ton capacity.

ing from 30 to 60. There is a tendency to limit the engine to about 30 horsepower, as this has proven to be an economical size. The majority of the motors are water-cooled, or water-thermo cooled, though the air-cooled cars have given good results. Chain drive is used on the majority of the cars, but the shaft-driven motor truck as developed by the Pierce-Arrow Co. marks the entrance of this type into the American motor truck field.

The selection of a truck depends on the duty that it is to perform and the service necessary. Special bodies may be fitted to any standard chassis. Until some means of applying drop bodies has been perfected, loading devices will be used. The Avery truck has a nigger-head placed on the motor shaft with two pulleys carrying a rope back, through and over the body of the car. Over a slide gate, heavy material is drawn into the car body.

One of the most important recent rulings by insurance companies affecting the extended use of motor trucks was made by the New York underwriters on Dec. 16, 1910, in removing the restrictions against gasoline propelled trucks, permitting them to be used in loading and unloading freight on railroad and steamship docks.

TABLE II.

COMPARISON OF COST OF OPERATING ONE 5-TON MOTOR TRUCK IN PLACE OF THREE HORSE DRAYS.

INVESTMENT.

THREE DRAYS.		ONE TRUCK.	
3 drays at $400	$1,200	1 truck at	$3,750
7 horses at $250	1,750		
6 sets of harness at $100	600		$3,750
	$3,550		

YEARLY EXPENSE.

THREE DRAYS.		ONE TRUCK.	
Interest at 6 per cent ($3,550)	$ 213	Interest at 6 per cent ($3,750)	$ 225.00
Depreciation:—		Depreciation (tires not included):—	
Horses at 33⅓ per cent ($1,750)	584	Frame, etc., at 10 per cent ($3,325).	332.50
Drays at 20 per cent ($1,200)	240	Chains, bearings, etc., at 50 per cent ($225)	112.50
Harness at 25 per cent ($600)	150	Body at 20 per cent ($200)	40.00
Total	$1,187	Total	$ 710.00

OPERATING COST.

THREE DRAYS.		ONE TRUCK.	
Repairs, paint, etc., at $150	$ 450	Repairs, paint, etc	$ 165
3 drivers, 300 days, at $2.50	2,250	1 driver, 300 days, $3	900
7 horses, feed, at 45 cents per day	1,150	Gas and oil, 300 days, 48 miles at 3½	480
7 shoeing, veterinary, etc., 12 months, at $2	168	Tires on above mileage	400
Total	$5,205	Total	$2,655

PENNSY DOCK

Will be Important Addition to Its Ore Handling Facilities.

For nearly a year past the Pennsylvania railway has been filling in the west breakwater at Cleveland for a distance of 1,000 feet from the shore line. The trestle work for the operation of the cars was built by the Standard Contracting Co., of Cleveland. Work upon the construction of a concrete dock will be begun in the spring, contracts having been awarded to the Great Lakes Dredge & Dock Co. Concrete piling designed by the Pennsylvania Railway Co.'s engineers will be used. The outer wall of the dock will be 1,700 feet from the wall of the breakwater, affording ample sea room. The present intention is to construct a dock with a capacity of 5,000,000 tons of ore per annum. This will be gradually increased to 8,000,000 tons. The dock is to be ready by the opening of navigation in 1912. The type of machine has not yet been decided upon, though it is understood that the 15-ton Hulett plant is being favorably considered. It is not the company's intention to abandon the docks now in the old riverbed, though the larger class of carriers will naturally go to the docks in the outer harbor when they are finished. The Pennsylvania company expects to tunnel under the Lake Shore tracks connecting the old river bed property with the outer harbor.

Contracts Awarded for New Plant

The Linde Air Products Co. has awarded a contract to the McClintic-Marshall Construction Co., Pittsburg, for the erection of its new plant at Trafford City, Pa. The main building will be 117 x 152 feet, one story, of steel, stone and brick construction. The company operates a number of plants in Europe, one at Buffalo, N. Y., and another at Chicago. Some time ago the company purchased four acres of land at Trafford City, Pa., adjoining the 70-acre tract on which the Westinghouse Electric & Mfg. Co., Pittsburg, is erecting a large foundry plant. Plans are also being prepared by the Linde Air Products Co. for a new plant at Elizabeth, N. J., and it is expected that the Trafford City, Pa., and New Jersey plants will be ready for operating about July 1.

A Modern Steam Specialty Manufacturing Plant

New Works of the Lunkenheimer Co.—Features of the Five-story Concrete Building and the Foundry, Which is Located on the Top Floor

As a result of the use of high steam pressures, the manufacturer of steam specialties has been confronted with many problems, particularly in the production of satisfactory castings, that have necessitated a large amount of scientific research to solve. To overcome these difficulties the Lunkenheimer Co., Cincinnati, some years ago, installed chemical and physical laboratories, where the raw materials and finished castings are analyzed and tested, and in addition the various operations involved in the manufacture of sound castings to withstand high pressures, were reduced, as nearly as possible, to a science. As a result, many novel, labor-saving methods have been developed, and the company's new plant, at Tremont and Lawnway streets, has been so arranged that they can be carried out with the greatest facility.

The building is of reinforced concrete construction, somewhat triangular in shape, five stories in height, 300 feet long and varying in width from 83 to 134 feet. Near the narrow end of the structure a spur track cuts through the building on a curve, on one side of which is located the chemical and physical laboratories and on the other the time-keeper's office and employes' entrance. The building is well-lighted, containing over a thousand windows which are fireproof, both frame and sash being made of pressed sheet steel treated to prevent corrosion. The foundations rest entirely on concrete piles, 20 inches in diameter, which are arranged in nests of five and six piles and are headed with concrete, 12 inches thick and 8½ feet in diameter, on which the column bearings rest, as shown in the cross-section of the building, Figs. 10 and 11. The upper floors are carried on reinforced concrete columns, varying in size from 20 x 20 inches to 24 x 24 inches, and spaced on 21-foot centers lengthwise of the building and on 14½-foot centers crosswise of the building. There are 70 supporting columns on the first floor, exclusive of those in the walls or partitions proper. Fig. 10 is a cross-section through the wide end of the building between the first and second rows of supporting columns, and shows the construction of the floors, the foundations and roof. The second, third and fourth floors are all supported by columns spaced as on the ground floor, the size of which progressively decrease by 2 inches each dimension for each successive floor.

The foundry is on the fifth and top floor and is lighted by the saw-tooth roof shown in Figs. 10 and 11. Each tooth is topped with 24-inch, conical ventilators, fitted with butterfly dampers. The horizontal supporting beams for the second, third, fourth and fifth floors are all 18 inches deep and 5½ inches wide, with a clearance of 11 feet, 8 inches, under the second and third floors and 12 feet under the fourth and fifth floors. The plan view of the foundry, Fig. 9, shows the general arrangement of the machine and bench molding floors, sand gratings and conveyors, core room, core ovens, core racks and the overhead trolley system. The narrow end of the foundry is partitioned off with a fire wall, which is fitted with a fire door, thus affording protection in case of fire and keeping most of the heat out of the molding room in summer. Fig. 4 is a view looking from the molding room into the fufrnace room and shows both fire wall and doorway. On the fourth floor is the sand-tempering plant and the casting cleaning department. The third floor contains the pattern storage and at one end a number of the automatic

FIG. 1—VIEW OF ONE SECTION OF THE LUNKENHEIMER CO.'S BRASS FOUNDRY, SHOWING MOLDING FLOORS WITH SHAKE-OUT GRATINGS. THE CORE DEPARTMENT IS AT THE RIGHT.

FIG. 2—THE FURNACE ROOM, SHOWING OPEN FLAME FURNACES. THE OPERATOR, IT WILL BE NOTED, IS TAKING THE TEMPERATURE OF THE METAL WITH AN OPTICAL PYROMETER

screw machines are located. On the second floor are the stock rooms and brass finishing departments and on the first floor are located the laboratory, time-keeper's office, shipping department and warehouse.

Fig. 1 is a view of the foundry looking toward the furnace room, showing the molding floors and sand grates *A*, with the core department at the right. The cords provided with handles at *B*, are the cables for manipulating the turntable switches. A broad aisle or gangway extends through the center of the foundry and the molding floors are arranged at right angles to the aisle. The molders work at the end of each floor near the windows and the general arrangement of gangway and floors resembles a grid.

In the organization of the plant each man is trained to perform certain duties, whether molding, melting, casting, sand-mixing, coremaking or casting cleaning, and all of the employes are under the supervision of a superintendent who has had wide experience in the business and is a thorough organizer.

The metal or raw material is received on the first floor and stored in a stock room, from which it is carried by elevator to the furnace room, where it is melted in ten open flame furnaces, Fig. 2. These furnaces are a modification of the Charlier type, which they resemble in their tumbling barrel appearance. In this department there are also two Kroeschell-Schwartz furnaces, installed by the Kroeschell Bros., Chicago, Ill., and two other oil melting crucible furnaces. These four furnaces are used for melting nickel to form the well-known special alloy used for valve seats.

FIG. 3—POURING-OFF A FLOOR OF VALVE FITTINGS. THIS SHOWS THE METHOD OF TILTING THE LADLE WHEN CASTING

Each of the open flame furnaces are fired with crude oil, by means of a burner designed by the company's engineers, and each heat consists of 1,200 pounds of metal, which can be melted down in 53 minutes, starting with a hot furnace. Started cold in 70 minutes the average time of each heat, however, is 1½ hours, which includes emptying the furnace of slag and recharging with new metal. This quick-melting holds down the loss, as the metal is given no chance to oxidize. Charging and pouring is done through one circular opening near the head of the furnace. The furnace is mounted on cast iron trunnions and is geared to a hand wheel for easy tilting. Fuel oil is supplied by a pipe from above. A shield is placed above and at the head of each furnace to protect the operator and the oil supply pipe from the excessive heat of the furnace when open or blowing. Each furnace has an outside length of 5 feet and a diameter of 30 inches. These furnaces are arranged on the north side of the center aisle of the melting room, being spaced in two rows with the heads together. The temperature of each heat is obtained by means of the optical pyrometer, shown in use in Fig. 2; *A*, is the battery box and furnishes the current for a small electric lamp located in the large end of the pyrometer. When looking through the instrument into the furnace a dull red, semi-circular glow is seen, which is brought to a maximum by adjusting the pyrometer, the degrees of heat being obtained by means of a pointer which moves on a circular, graduated disc, and 74 points or degrees on this disc are equivalent to 3,000 degrees Fahr. Thus, a previously-determined pouring temperature is ascertained for every heat, and guesswork is thereby eliminated.

Many different alloys are used and castings are made in brass and bronze, semi-steel, aluminum, nickel alloys, etc. For high grade steam valves the content of lead in the metal is guaranteed under 2 per cent. A standard formula used is the well-known gov-

ernment bronze, copper, 88 per cent; tin, 10 per cent and zinc, 2 per cent, and another mixture used contains copper, 87 per cent; tin, 8 per cent; zinc, 4 per cent, and lead, 1 per cent. The shrinkage of metal in melting is less than 3 per cent, all new metal being used with the exception of sprues and other returned metal and turnings from the finishing shop. This scrap is melted in two open flame furnaces and poured into ingots, the molds for which are in the form of an elongated oval with trunnions on either end on which they rest on a wrought iron trestle. When the ingot has set, the mold is given a half revolution on its trunnions and the ingot drops out into a sand-filled iron pan underneath, which protects the cement floor from being broken by the continual contact of the dropping metal. There are cement floors both in the melting room and in the foundry, and although metal spilling is unavoidable, the cement does not explode or flake, as is often the case when the cement is laid on the ground.

Casting.

The metal is delivered to the molding floors in specially constructed wrought iron or steel ladles, lined with fire brick. The ladles are conveyed to the furnaces on two-wheeled buggies. These operate between the furnaces and the gangway where the ladles are picked up by overhead traveling trolleys by means of the bales shown in Fig. 4. These bales, it will be noted, are furnished with a long handle with a loop at the top, into which the hook of the tackle hitches. The metal is delivered to the molding floors by a trolley system provided at each intersection of the main and auxiliary system with a turntable switch, which operates only one quarter turn, delivering a ladle crane from the main track to the side track and vice versa. Crane carriages are allowed to go in one direction only in the main track, all ladle cranes being run from the melting department onto the right track and back on the left track. However, at any switch a ladle can be transferred from the right track to the left track for return to the melting room. These switches are revolved by cords, *B*, Fig. 1, the handles of which are hung within easy reach of the operator. These tracks are so arranged that the ladle scrap can be delivered to the molds, which are in turn placed close to the gratings. In the melting room the ladles are lowered onto ladle trucks that carry them to the furnaces. By this overhead

FIG. 4—THE CASTING GANG WITH LADLES FILLED WITH METAL WHICH WILL BE DELIVERED TO THE VARIOUS FLOORS BY THE OVERHEAD TROLLEY SYSTEM. THESE MEN POUR-OFF CONTINUOUSLY, AS THE MOLDERS ARE ENGAGED IN MOLDING THROUGHOUT THE DAY

trolley system, ladles full of metal are quickly conveyed from the furnaces to the molds. In the melting room but one turntable switch is provided, all ladles being run to the end of the track and are switched over for their return on the right side.

Fig. 3 shows a floor of valve fittings being poured-off. The ladle is suspended from the trolley by means of the bale and is tilted by the lever *B*, which is riveted to the side of the ladle, so that when the trolley lever is pulled towards the pourer, the ladle revolves on its trunnions in the bale sockets. The tackle is manipulated by the operator, *A*. Fig. 4 is a view of the casting crew which forms one unit in the division of labor. The ladle is kept perpendicular while in transit, by means of the ring, *A*, Fig. 4, carried by the bale handle and which is slipped over the tilting lever, *B*, Fig. 3. The section of the track extending into the furnace room is also shown in Fig. 4, as well as the turntable cables, *B*. When the molds are sufficiently cool they are shaken-out by being dumped onto the gratings which form the gangway between the molding floors. A

FIG. 5—THE CASTING CLEANING DEPARTMENT, SHOWING POWER SPRUE CUTTERS, THE SAND BLAST ROOM, *A*, AND A BAND SAW AT THE EXTREME LEFT

FIG. 6—SAND TEMPERING AND PREPARING FLOOR, LOCATED UNDERNEATH THE MOLDING FLOORS OF THE FOUNDRY. WHEN THE MOLDS ARE SHAKEN-OUT OVER THE GRATINGS, IT FALLS ONTO DEFLECTORS, *A*, WHICH DIVERT THE SAND INTO GANGWAYS ON EITHER SIDE OF THE MIXERS, OF WHICH THERE ARE 21 ON THIS FLOOR.

view of these gratings is shown at *A*, Fig. 1, and the sand passes through the openings to the floor underneath while the castings remain on the gratings. The castings, if intended for valve bodies, are dipped in barrels of water to bring out the color, and the proper time to shake out is left to the judgment of the molder. The color of a valve body made from a high-grade alloy rich in tin, and low in lead, is not as brilliant as when made from the cheaper alloys containing less tin and more lead. The castings for trimmings are not dipped for color, as they must be machined. They are removed from the gratings and are piled on four-wheeled trucks by which they are delivered to chutes through which they drop into bins on the floor below. Five power sprue cutters are used to remove the sprues, gates, etc., from the small work. After the removal of the gates and sprues, the castings are taken to the sand blast cleaning plant. All castings such as valve and lubricator bodies are hand-cleaned on the inside only by a sand blast gun. All other parts are sand blast cleaned in four Paxson-Warren sand blast tumbling barrels, installed by the J. W. Paxson Co., Philadelphia. All grinders are equipped with a suction exhaust that removes all dust and dirt from the room. No water tumblers are used, as it has been found that this tumbling action hammers the scale into the metal so that tools in the machine shop do not take hold with the same ease as when the castings have passed through the sand blast tumbling barrels in which the scale has been removed. After being cleaned and ground the castings are inspected, weighed and are delivered to the rough stock room, from which they are issued to the finishing department on order, as required.

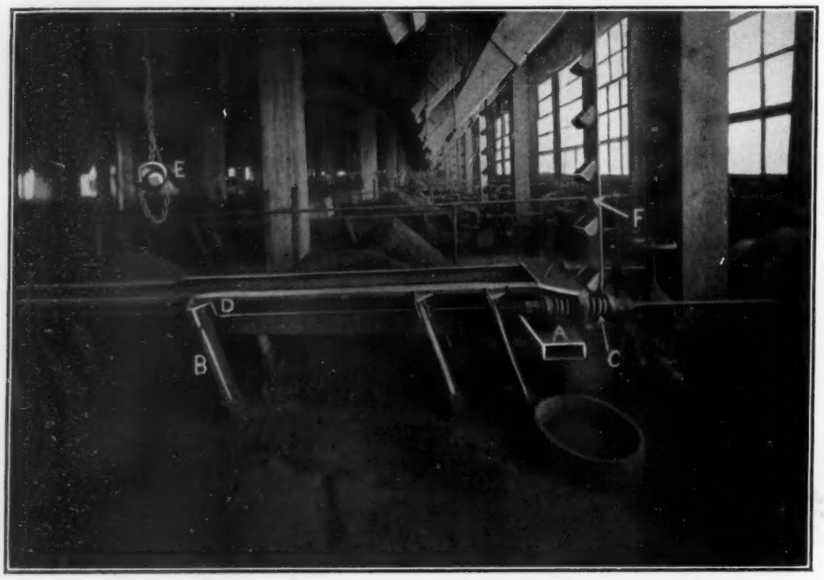


FIG. 7—VIEW OF THE SAND-PREPARING PLANT, SHOWING ONE ROW OF SAND MIXERS

Testing.

In the finishing department the castings are first subjected to a hydraulic test, and the pressure applied for high pressure valves ranges from 200 to 1,000 pounds. If the castings successfully withstand this test they are passed through the cycle of operations which terminates in the finished valve, and if defective they are returned to the foundry. The loss from defective castings is less than 6 per cent on high pressure work, which includes leaky castings. On ordinary valves the percentage of loss from defective castings is 2.70 per cent. This average, however, is kept low by figuring in such work as oil cups, grease cups, trimmings, etc. These averages do not represent the best records that were made when the shop was small and hand-work prevailed entirely. Then the percentage of loss was frequently as low as 2.50.

Duplicate work, such as standard valves and fittings, etc., is molded on machines which are arranged along the entire length of the north side of the molding room. At present there are 13 molding machines in operation, including ten Tabor machines, two Mumford squeezers and one Berkshire automatic, installed, respectively, by the Tabor Mfg. Co., Philadelphia, the Mumford Molding Machine Co., New York City, and the Berkshire Mfg. Co., Cleveland. These machines are arranged in pairs between the sand conveyors and spouts, and produce from 150 to 275 molds per machine each day. Two men, an operator and a helper, are used on each machine. The helper removes the flasks from the machine bench back of the operator, to the floor, sets the cores and closes the flasks ready for pouring. Machine molders are all paid on the piecework basis, and a premium is paid on all molds made in excess of the number fixed as a day's work. Special work and loose castings that cannot be

profitably adapted to or handled on machines, are made by bench molders on the south side of the main floor. The bench molders are grouped along the wall with a bench running on either side of the sand conveyor.

Sand is delivered at the height of the bench in a sand bin adjacent to the molder's bench. At one end of the bench molding floor is a separate floor for heavy, special brasswork served by a Niles, two-ton crane running from the wall to the center aisle. The casting floors, for both the machine and bench molding floors, are located back of the molding benches and adjacent to the main aisle of the foundry. All molding is done along the outer walls, where an abundance of light is provided by the windows. The foundry is well lighted by day by the saw tooth roof, which faces north.

FIG. 8—VIEW OF ONE CORNER OF THE CHEMICAL LABORATORY

The core department is at present located in the southwest corner of the main floor. Three double core benches are provided and at the ends of the benches the core ovens are located. The oven equipment consists of a battery of eight Millett ovens, and a large truck oven for heavier work. Silica sand is used for making the cores. It is bonded with core oil in the proportion of one of oil to 50 of sand. The cores are all made in one piece, without either wires or spurs through the seats. They are vented from end to end, are soft and yet sufficiently strong to withstand the pressure of the metal. Dryers are used and are essential in making valve cores in this manner. These cores are as nearly perfect as they can be made and reflect the results of the systematic organization of the labor in this shop. The core room and core ovens will ultimately be placed on the floor below the foundry, and it is planned later, to install 44 additional molding machines in the section of the foundry vacated by the core department. The ovens are gas-fired and after the cores are baked they are stored on metal core racks until used.

When the molds are shaken-out the molding sand falls through the gratings to the floor below, where it is mixed and screened, being returned to the molders by conveyor belts shown at *F*, Fig. 7. Directly underneath the gratings, which form part of the ceiling of the fourth floor, are the vibratory sand mixers shown in Fig. 7. The sand, however, does not fall directly into the mixer, as it must first be sprayed with water and cooled. It is, therefore, deflected into aisles at the sides of the mixers, and enough sand is provided to carry on the work for two days, so that the hot sand is not used until the following day, thus giving it a chance to thoroughly cool. The deflectors, shown in Fig. 6, are situated directly underneath the gratings in the gangways of the molding floor. The deflectors are long steel plates, hinged on the principle of a butterfly valve. In Fig. 6 the deflector in the foreground is set so as to throw the sand away

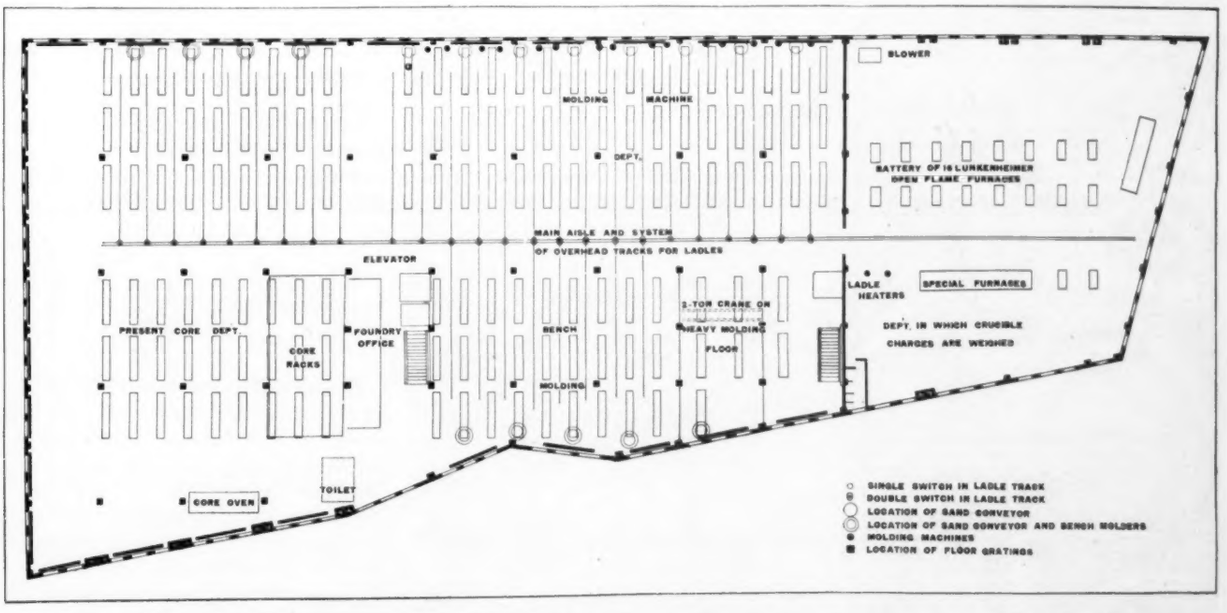


FIG. 9—GROUND PLAN OF THE FOUNDRY LOCATED ON THE FIFTH FLOOR OF THE LUNKENHEIMER CO.'S NEW PLANT

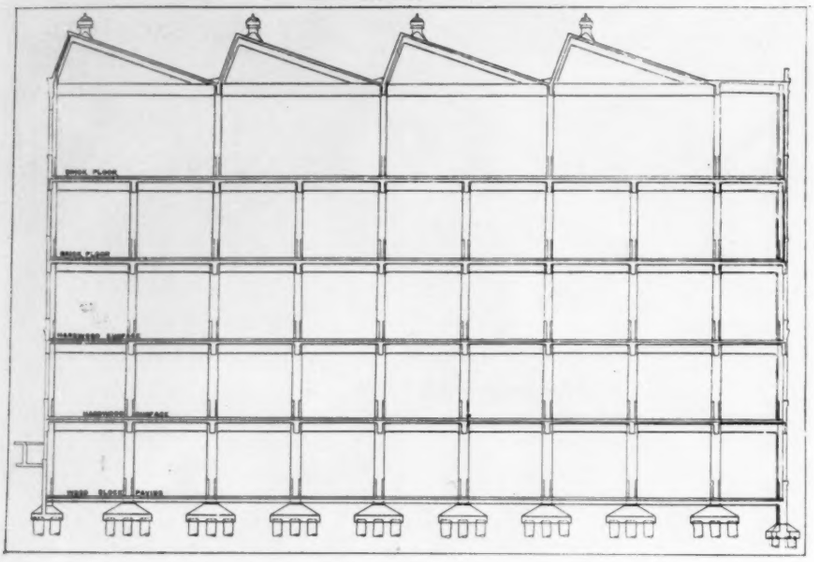


FIG. 10—CROSS-SECTION THROUGH THE WIDE END OF THE LUNKENHEIMER CO.' PLANT

from the first gangway, and it is held in this position by a weight suspended from a chain, as seen at *E*, Fig. 7. When the sand falls into the aisle at the side of the tempering trough it is first sprayed with water. An experienced man is in charge of this operation, as the amount of water used must be carefully gaged. The sand in which heavy castings have been molded requires more water than that used for light work. An effort, however, is made to keep the moisture between 8 and 11 per cent. To accurately determine the proper degree of moisture, a sample of sand is tested in the laboratory each day.

After the sand has been sprayed it is shoveled into piles, as shown in Fig. 6, and in due time is filled into the mixers, where it is screened and eventually again reaches the molder. There are 21 vibratory sand shakers in this department, as shown in Fig. 7. They are merely U-shaped troughs with one end deeper than the remainder of the trough. In this deep section, which commences at *D*, Fig. 7, is the screen, which is on a level with the upper elevation of the trough. The sand can be thrown into any part of the trough and will travel towards the screen. This is accomplished by a vibratory, reciprocating movement produced by two eccentrics attached to pulley. The trough is supported by a number of sloping, flexible, hardwood legs, which, when the trough is pulled toward the pulley end, cause it to rise about ¼ inch, thus producing a movement which causes the sand to always travel towards the screen. In Fig. 7, *A* is the spout through which the screenings are carried to the sieve on the floor from which they are thrown into receptacles to be carried to the metal separating room. The screened sand falls into the lower compartment underneath the screen and travels from the open end into the conveying buckets, which carry it to the floor above. There it is dumped into bins which are open on both sides of the conveyor, and deliver the sand to the molder. In Fig. 7, *BB* are the flexible hardwood trough supports, *C* the springs that absorb the shock caused by the thrust of the eccentric rod, *E* the deflector weight and *F* the conveyor belts.

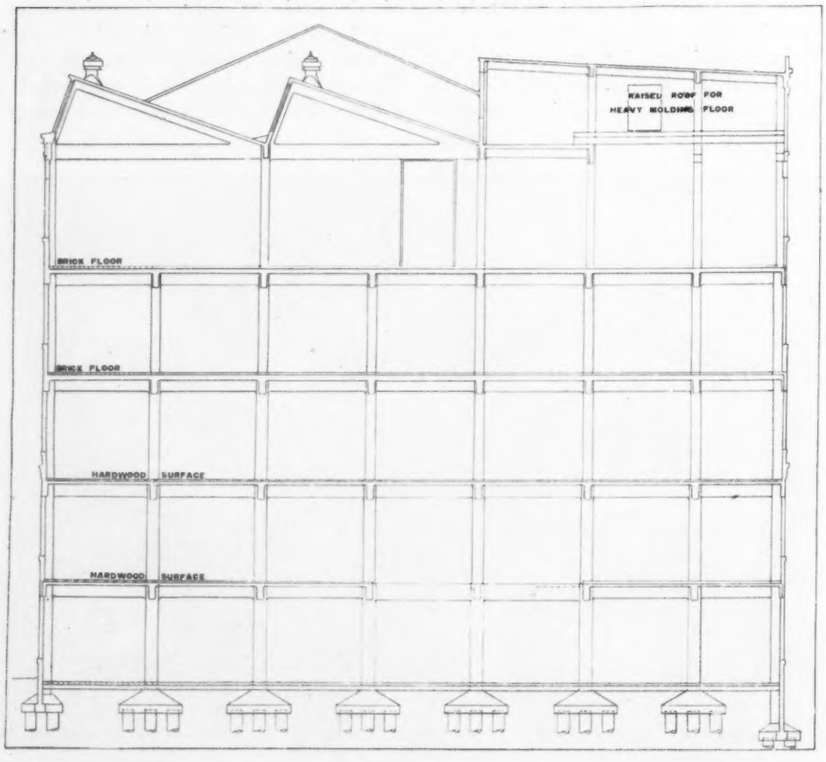


FIG. 11—CROSS-SECTION THROUGH ANOTHER PART OF THE LUNKENHEIMER CO.'S PLANT, SHOWING THE RAISED ROOF OVER THE HEAVY MOLDING FLOORS

Fig. 8 is a view of one corner of the laboratory, showing the electric induction furnace table, with a small experimental furnace at *A*, which is operated from an incandescent lamp socket and at 220 volts generate up to 3,000 degrees of heat; at *B*, Fig. 8, is the table for iron analyses and at *C* the burners under the exhaust hood. George K. Elliott, well-know for his researches in high pressure steam metallurgy, is the chief chemist of the Lunkenheimer Co.

The entire plant was designed according to plans based on the best and latest foundry practice in both this country and Europe and much of the interior equipment was designed and built by the Lunkenheimer Co. The building was designed and constructed by Bert L. Baldwin & Co., engineers, Cincinnati.

Chemical Engineers Meet.—The third semi-annual meeting of the American Institute of Chemical Engineers will be held in Chicago from June 21 to 24. The announcement is made by Secretary J. C. Olsen, Polytechnic Institute, Brooklyn, that arrangements will be made to visit works in the Chicago district, and that committees on chemical engineering education and standardization of boiler tests will have important reports to read.

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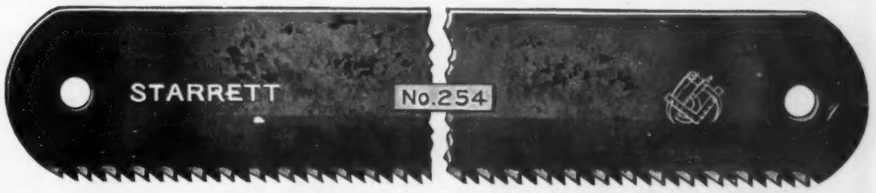

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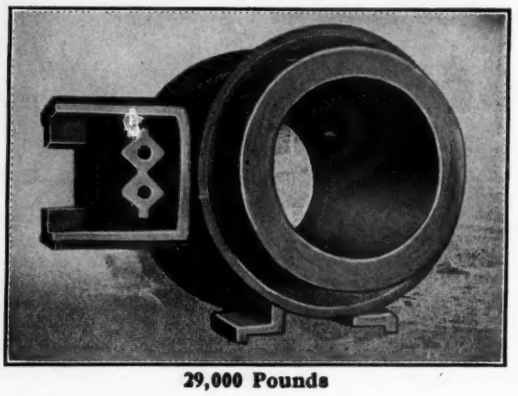

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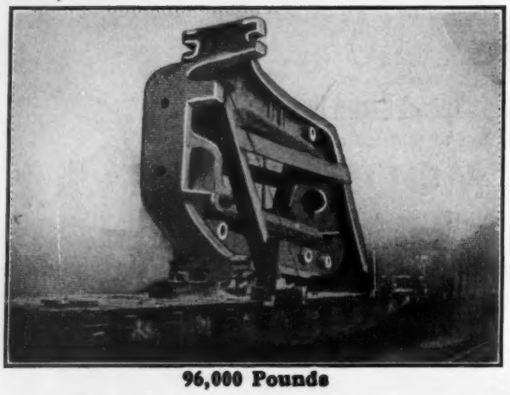

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